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*NATURAL SCIENCES IN AMERICA*

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# LIFE HISTORIES

162189

OF

# NORTH AMERICAN BIRDS

Charles E[mil] Bendire

Volumes I and II

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UNITED STATES NATIONAL MUSEUM.
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# LIFE HISTORIES

OF

# NORTH AMERICAN BIRDS

WITH SPECIAL REFERENCE TO

## THEIR BREEDING HABITS AND EGGS,

WITH

TWELVE LITHOGRAPHIC PLATES.

BY

CHARLES BENDIRE, CAPTAIN, U. S. ARMY (RETIRED),

*Honorary Curator of the Department of Oölogy, U. S. National Museum,*
*Member of the American Ornithologists' Union.*

WASHINGTON:
GOVERNMENT PRINTING OFFICE
1892.

# ADVERTISEMENT.

This work (Special Bulletin No. 1) is one of a series of papers intended to illustrate the collections belonging to, or placed in charge of, the Smithsonian Institution, and deposited in the U. S. National Museum.

The publications of the National Museum consist of two series: the Bulletin and the Proceedings. A small edition of each paper in the Proceedings is distributed in pamphlet form to specialists in advance of the publication of the bound volume. The Bulletin is issued only in volumes. Those hitherto published have been octavos, but it has been decided that for works of the size and character of the present Bulletin the quarto form is preferable.

The Bulletin of the U. S. National Museum, the publication of which was commenced in 1875, consists of elaborate papers based upon the collections of the Museum, reports of expeditions, etc. The Proceedings are intended to facilitate the prompt publication of freshly acquired facts relating to biology, anthropology, and geology, descriptions of restricted groups of animals and plants, discussions of particular questions relative to the synonymy of species, and the diaries of minor expeditions.

Other papers of more general popular interest are printed in the appendix to the annual report.

Full lists of the publications of the Museum may be found in the current catalogue of the publications of the Smithsonian Institution.

Papers intended for publication in the Proceedings and Bulletin of the U. S. National Museum are referred to the Advisory Committee on Publications, composed as follows: T. H. Bean (chairman), A. Howard Clark, R. E. Earll, Otis T. Mason, Leonhard Stejneger, Frederick W. True, and Lester F. Ward.

S. P. LANGLEY,

*Secretary of the Smithsonian Institution.*

WASHINGTON, D. C., *May 6, 1892.*

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# INTRODUCTION.

This work on the Life Histories of North American Birds is based largely upon the collections in the U S. National Museum. It was the wish of the late Prof. Spencer F. Baird that a comprehensive work on this subject should be published, bringing together the great advances in our knowledge made during the past few years. This wish was also shared by Prof. Langley and Dr. Goode, and with their concurrence the present work has been written.

Since the publication by the Smithsonian Institution in 1857 of an initial volume on North American Oölogy, by the late Dr. T. M. Brewer—which work was not finished owing to lack of material—and of Baird, Brewer and Ridgway's "History of North American Birds" in 1874, no systematic and comprehensive work on the oölogy of this country has appeared. Large collections have been brought together during the last three decades, and great advances, only rendered possible by the more general interest that the subject has attracted, have been made.

It is not intended that this work shall consist merely of descriptions of nests and eggs. Special attention has been given to the life history, the migratory and breeding ranges, and food of each species. In this connection the latest information, including the field notes made by myself and others and hitherto unpublished, has been freely used.

Although involving considerably more labor and a certain amount of repetition, I treat each species and subspecies separately, and endeavor to define the "breeding range" of each as accurately as possible. This method is to some extent open to criticism, and especially so where a species is divided into several geographical races between the boundaries of whose ranges a neutral zone exists in which they intergrade. On account of the limited knowledge we possess of many of our birds, I am well aware that the information given under this head is more or less imperfect, but this is irremediable in many instances at present.

The present volume relates only to land birds. The classification given in the Code and Check List of the American Ornithologists' Union has been followed, and the synonymy and nomenclature used in this list have also been adopted, with the emendations that have been made up to date.

When it is not expressly stated to the contrary, the type specimens figured have been presented to the U. S. National Museum collection by the gentlemen whose names are given. Without mentioning each by name, my thanks are due to the many friends whose assistance has so greatly aided me in the preparation of this volume and added to its completeness, and whose coöperation will, I hope, be continued until the work is finished.

The original water-color drawings from which the plates have been reproduced were made by Mr. John L. Ridgway, of Washington, D. C., to whose skill and painstaking care the excellence of the illustrations is largely due. The chromolithographic reproductions of these plates were made by the Ketterlinus Printing Company, of Philadelphia, Pa., and it gives me pleasure to say that they are as faithful copies of the original drawings as it is possible to make.

THE AUTHOR.

# LIFE HISTORIES OF NORTH AMERICAN BIRDS.

By CHARLES BENDIRE, *Captain U. S. Army (retired).*

## GALLINACEOUS BIRDS.

### Family TETRAONIDÆ. GROUSE, PARTRIDGES, ETC.

### 1. Colinus virginianus (LINNÆUS).

BOB WHITE.

*Tetrao virginianus* LINNÆUS, Systema Naturæ, ed. 10, 1, 1758, 161.
*Colinus virginianus* STEJNEGER, Auk, II, January 1885, 45.
(B 471, C 389, R 480, C 571, U 289.)

GEOGRAPHICAL RANGE: Eastern United States and southern Ontario, Canada; west to eastern Minnesota, Nebraska, Kansas, Indian Territory, and eastern Texas; south to Georgia, Alabama, and other Gulf States.

This species, one of the most widely distributed of our game birds, is better known throughout the Northern and Middle States as the Quail, and under the name of Partridge or Virginia Partridge in the South. It is found everywhere, more or less abundantly in suitable localities within the United States, east of the Missouri and Mississippi Rivers, excepting in Florida, where it is replaced by the Florida Bob White, and in the northern portions of the New England States. In these, north of Massachusetts, it is rare, but occurs occasionally in the southern portions of Vermont and New Hampshire, and less frequently in Maine. In northern New York it is very rare. West of the Mississippi it occurs in Louisiana, eastern Texas, the eastern part of the Indian Territory, Arkansas, Missouri, Kansas, and the greater portion of Nebraska, where it has advanced beyond the central part of the State.

Mr. W. M. Wolfe, of Kearney, Nebraska, informs me that the Bob Whites are becoming more and more abundant, and are now common as far west as Ogallala. Dr. T. E. Wilcox, surgeon U. S. Army, writes me to the same effect from Fort Niobrara, Nebraska, saying it is steadily advancing westward and is now to be found 30 miles west of this post. It is also gradually advancing northward.

Mr. W. W. Cooke states that in Minnesota it has followed up the settlements, and in the eastern part of the State has reached the line of the Northern

Pacific Railroad, about latitude 46°; also that in South Dakota it is abundant, and has advanced to latitude 44° 30′.[1]

North of the United States Mr. T. McIlwraith gives it as a permanent resident in southern Ontario, Canada.[2]

At the present time the Bob Whites are most abundant in the Central and some of the Southern States. They have also been successfully introduced in various localities in the West. According to information received from Mr. Denis Gale, of Gold Hill, Boulder County, Colorado, it is now well established along the South Platte River and its tributaries in the vicinity of Denver, Colorado, and is known to occur also in portions of northern New Mexico.

As early as 1872 Prof. J. A. Allen stated in the American Naturalist that these birds had recently been introduced in the Great Salt Lake Valley, Utah, and that in the summer of 1871 young had been raised and gave promise of multiplying rapidly and becoming thoroughly naturalized. At the present time they are common in various parts of Utah, and Professor Allen's predictions have been fully verified. According to Mr. H. K. Taylor the Bob Whites are quite abundant about Gilroy, California.[3]

In the vicinity of Boisé City, Idaho, a few pairs were turned out some time in 1875. In the fall of 1878 I found them abundant between that point and Snake River, all along the Boisé River, and in 1882 they had spread to the west side of Snake River, fully 50 miles from where they were first liberated. Dr. T. E. Wilcox, U. S. Army, who first noticed them there, says, "I never saw coveys so large and numerous as I found them about Boisé. Cover and food, as well as climate, are all favorable."[4]

They are also quite abundant now in portions of the Willamette Valley, Oregon, as well as on several islands in Puget Sound, Washington. In fact, they are well adapted for introduction into any country where the climate is not too severe in winter, and where suitable food and shelter are to be found, they seem to thrive and adapt themselves to the surroundings.

Excepting, perhaps, in its extreme northern range, the Bob Whites are residents, and breed wherever found. They are partial to more or less open country. Fields and pastures, interspersed with small bodies of woodland, country roads, bordered by brush and briar patches, as well as the edges of meadow and lowlands, are its favorite abiding places. In southern Louisiana they are very partial to the borders of hammock land and open pine woods.

They are never found in large packs; each covey generally keeps to itself, and rarely moves far from the place where it was raised. The mating season commences in April, when the coveys or such portions of them remaining begin to break up, each pair selecting a suitable nesting site. Nidification begins usually about May 1; in the Southern States somewhat earlier, and in

[1] Report on Bird Migration of the Mississippi Valley, Bull. II, U. S. Dept. of Agric., Div. Economic Ornith., p. 102.

[2] Birds of Ontario, pp. 140, 141.

[3] Ornithologist and Oölogist, Vol. IV, 1889, p. 93.

[4] Auk, Vol. II, 1885, p. 315.

the more northern portions of their breeding range it is often delayed until June. The nest is always placed on the ground and is generally a very simple affair. A saucer-shaped cavity is excavated (occasionally quite a deep one) alongside a patch of overhanging weeds or a tall bunch of grass. Again, it may be placed under a small bush or in a briar patch, by the side of a fence, in cultivated fields or pastures, and even in gardens close to houses; and in the South, "Cotton rows" are favorite nesting sites. This cavity is lined with dry grasses or bits of grain stubble. The nest is generally well hidden, arched over naturally by overhanging vines, bushes or weeds, and usually open on one side. Occasionally a nest is arched over artificially, but in most cases, where there is no natural cover existing, no dome is attempted.

Judge John N. Clark, of Saybrook, Connecticut, writes me of having seen a male Bob White at work constructing a domed nest. He says: "In May, 1887, while on a hill back of my house one morning, I heard a Quail whistle, but the note, which was continually repeated, had a smothered sound. Tracking the notes to their source, I found a male Bob White building a nest in a little patch of dewberry vines. He was busy carrying in the grasses and weaving a roof, as well as whistling at his work. The dome was very expertly fashioned, and fitted into its place without changing the surroundings, so that I believe I would never have observed it, had he kept quiet." Another nest, found by Mr. G. E. Beyer, of New Orleans, Louisiana, was entirely constructed of pine needles, arched over, and the entrance probably a foot or more from the nest proper.

In North Carolina, according to Mr. R. B. McLaughlin, the Bob Whites preferred to nest in sedge-fields, so very common in that region, and nearly all the nests observed by him were placed near paths and roads. The favorite materials used for lining the nest were the long dry blades from the sedge tussocks.

Capt. B. F. Goss, of Pewaukee, Wisconsin, has found these birds nesting in the open prairies, miles from timber and brush of any kind; but such instances are rather unusual.

Among uncommon nesting sites the following deserves mention: Mr. Lynds Jones, of Grinnell, Iowa, found a nest of a pair of Bob Whites under the edge of a bridge, which contained nine eggs. It had been placed under a plank in the road, and during a heavy rainstorm was flooded and deserted.

Prof. Robert Ridgway, of the Smithsonian Institution, found a Bob White's nest containing fresh eggs, on October 16, and Mr. H. C. Munger, of Jefferson City, Missouri, publishes in Forest and Stream, of March 6, 1879, a still more remarkable find. He writes as follows:

"Jefferson City, Missouri, *February* 6, 1879.

"Editor Forest and Stream:

"I noticed an article in a local paper here yesterday, stating that a gentleman while out hunting in Calaway County, a county adjoining this, in the month of January, found a Quail's nest with fifteen or sixteen eggs, and the

mother bird sitting on the nest. After she flew off the nest, he examined it carefully, the bunch of grass covering it being filled with ice and frozen solid, leaving just space enough under it for the bird and her nest and a place of exit. A few days after finding it he and other parties went to examine it again. This time they found the bird still sitting on the nest but frozen to death. A portion of the eggs had been hatched, but the young were also frozen. Was this not a a very singular occurrence? I should have been somewhat skeptical in regard to it if I had not met with very nearly a similar case while out quail shooting four years ago this winter, in company with a venerable sportsman, Mr. Pratt, of this place. Our dogs made a point. We flushed a single bird after considerable kicking around in the grass and snow, and found she had been sitting on her nest containing three apparently fresh eggs; but alas, she never returned to finish her maternal duties. It was too late when we found the cause of her reluctant flight."

The Bob White is unquestionably the most prolific of all our game birds, the number of eggs laid varying from twelve to eighteen to a clutch. Fifteen may be considered a fair average. As many as thirty-seven eggs have been found in one nest, unquestionably the product of two, or even three, hens. In such large sets the eggs are always placed in layers or tiers, the small or pointed ends usually toward the center. An egg is laid daily till the set is completed.

The late Dr. T. M. Brewer states that he "never found less than twenty-four eggs in a nest, and from that to thirty-two."[1] If the eggs are all laid by a single bird, which I think is doubtful, such large sets as Dr. Brewer mentions may possibly be accounted for in the following manner: In Massachusetts and in other portions of its northern range the Bob Whites probably rear but one brood, and lay a larger number of eggs to a set than they do in the Middle and Southern States, where the fact seems to be pretty well established that two and even three broods are sometimes raised during a favorable season; parents with young of three different sizes having been met with now and then, which would tend to substantiate this assertion. Incubation lasts about twenty-four days, in which duty the male is said to assist, at times at least.

Mr. Lynds Jones, who has had excellent opportunities to study the habits of the Bob White, writes me: "The female is seldom seen during the nesting season, while the male attracts our attention with his loud and fearless call, usually uttered from some fencepost or other elevated position. If driven from this, he darts into the grass or shrubbery and there repeats his call. I never succeeded in flushing the female at such times; she is shy and coy, while the male is bold and fearless. While I have never flushed the male from the nest, I have frequently found him near it. If the nest is disturbed while the set of eggs is still incomplete, the birds usually abandon it; but should incubation be somewhat advanced they will return and hatch their brood. The male

[1] History North American Birds, Vol. III, p. 472.

is very attentive to the setting hen, often making excursions into the grass after food, apparently for her benefit."

That the male Bob White takes the whole duty of incubation upon himself, should some accident befall the female, which unfortunately happens only too often, is conclusively proven by the following statement, from Dr. William C. Avery, of Greensboro, Alabama, who writes me as follows: "In June, 1886, while on a visit to Dr. J. M. Pickett, of Cedarville, Alabama, this gentleman informed me of having seen a male Bob White incubating; he had visited the nest at various times during the day, and on different days, and always found the male on the nest. Wishing to be an eye witness of so interesting a phenomenon, I rode several miles with the doctor to see this male Bob White on his nest. There we found him, faithfully warming his treasures, but not into life. The eggs were never hatched. Dr. Pickett went frequently to the place, until long after the period of incubation had elapsed, and finding that the eggs would not hatch, he destroyed them, to prevent the useless occupation of the nest by the male. The female had probably been dead some hours, and the eggs were cold before the male took the nest, hence they did not hatch. How different is he in his nature from some other gallinaceous birds, which only seek the female when impelled by sexual desire. I know no other bird that will take the nest and faithfully brood upon the eggs when the female has been killed."[1]

These birds are very sociable in disposition, and, when not constantly disturbed or shot at, become quite tame and may frequently be seen about dwelling houses, barns, and in gardens, especially during the late fall, winter, and early spring. As soon as the young are hatched they become more shy and retiring. The young leave the nest as soon as hatched, and have been seen running about with pieces of the shell sticking to them. They are faithfully cared for by both parents, who make use of all sorts of artifices, such as feigning lameness and fluttering along just out of reach of the intruder, to lure him away from the young brood; the young scattering, in the mean time, and hiding in the grass and under leaves at the danger signal of the parents, and remaining quiet until called together again by either of them, as soon as all danger is passed. When they are about two or three weeks old, the male takes charge of the first brood, while the female begins to lay her second clutch of eggs. This is usually a smaller one than the first, averaging only about twelve eggs. The young are at first exclusively fed on insect food, and later on small seeds, grains, and berries.

Aside from insects of various kinds, the favorite food of the Bob White consists of buckwheat, wheat, rye, oats, the seed of the locust, wild pease, tick-trefoil (*Desmodium*), smartweeds (*Polygonum*), sunflower, and bitterweed, the partridge berry (*Michella*), wintergreen (*Gaultheria*), nannyberries (*Viburnum*),

[1] The fact that the male Bob White takes occasionally the entire duties of incubation on himself, should the female be killed, appears to be not an unusual occurrence with this species, at least two similar instances having come under the observation of other parties.

wild grapes, and other small berries. In the late fall they often feed on the seeds of the skunk cabbage, acorns of different kinds, as well as on beechnuts.

Mr. W. M. Wolfe, of Kearney, Nebraska, writes me: "Here, the male takes the young to the wheat fields and stubble early in July; at first, they return to the brush for the night, but as soon as harvesting fairly commences they spend all their time in the fields, huddling together at night in the open. Here they form a circle with their heads out and crowd close together. The male remains outside the ring and close at hand. The female, after raising her second brood, takes the chicks to the stubble as soon as they are able to fly. The broods unite in September, and all care on the part of the parents ceases soon after, though they all remain together until the following spring."

Aside from the many enemies that the Bob White has to contend with during the breeding season, the mowing machine is probably one of the greatest factors of destruction, as many brooding birds and eggs are annually destroyed through its agency.

The males commence singing about May 1; their song is the well-known "Bob White," or "Ah, Bob White." One of their love notes may be translated as "Pease most ripe," another call as "No more wet," or "More wet." A shrill "wee-teeh" is used as a note of warning, and one to assemble when the covey has dispersed resembles "Quoi-hee, quoi-hee." A subdued clucking when undisturbed, and a rapidly repeated twitter when suddenly surprised, are frequently used as well.

In the fall, in certain portions of the country, these birds, while not actually migratory, leave the localities where they raised their broods for others, possibly on account of the desire for some particular kind of food. Mr. G. E. Beyer writes me that in the vicinity of Madisonville, Louisiana, the Bob Whites leave the hammock lands in the fall and retreat considerable distances into the open pine woods, along small water courses, returning only when nesting time approaches.

The eggs of the Bob White vary from a round ovate to subpyriform in shape, are dull white in color, slightly glossy, and often partially stained a buffy yellow by contact with the grass or soil on which they lie. The shell is smooth and remarkably strong and thick for the size of the egg. Their average size is about 30 by 24 millimetres, the largest egg in the U. S. National Museum collection measuring 32.5 by 25, the smallest 26 by 22.5 millimetres.

The type specimen, No. 12786, Pl. 1, Fig. 1, selected from a set of ten eggs, was collected by Dr. William Wood at East Windsor Hill, Connecticut, June 14, 1866.

## 2. Colinus virginianus floridanus (Coues).

FLORIDA BOB WHITE.

*Ortyx virginianus* var. *floridanus* Coues, Key to North American birds, 1872, 237.
*Colinus virginianus floridanus* Stejneger, Auk, II, January, 1885, 45.
(B —, C 389*a*, R 480*a*, C 572, U 289*a*.)

Geographical range: Florida, except the extreme southern portion.

This somewhat smaller and darker race is found only in Florida. Dr. W. L. Ralph, who has enjoyed excellent opportunities of studying the habits of the Florida Bob White, and is well known as a reliable and careful observer, writes me as follows: "It is still common throughout the northern and central parts of the State, and probably in the southern portions as well, but they are not nearly so abundant as formerly, owing to the persecution they receive from northern visitors and negroes, and to the want of efficient game laws. They are very tame and confiding, and when not molested prefer to live near man, probably on account of greater security from the attacks of beasts and birds of prey. They become much attached to the localities where they breed, and seldom wander far from these, even when much persecuted. I have known cases where they were hunted day after day until their number was reduced to two or three birds to each covey, yet those which were left could always be found at their old places of resort. The localities they like best are open woods grown up with saw palmettos or low bushes, or fields with woods near them, and they are particularly fond of slovenly cultivated grounds that have bushes and weeds growing thickly along their borders."

The pairing season commences early. Mr. J. F. Menge writes me: "In Lee County, Florida, it nests sometimes as early as February 15. A dry secluded spot is selected for a nesting site, usually under a saw palmetto or low bush in open woods or in a field thickly grown up with grass and weeds."

Mr. W. E. D. Scott states, "The Florida Bob White is abundant in the vicinity of Tarpon Springs, and breeds in numbers in early April. At least two broods are raised, as I have found birds but a few days old in the first week in July."

Their general habits are similar to those of its northern relative. Their food consists of insects of various kinds, small seeds, and cabbage-palm berries, and their various notes resemble those of the Bob White. Mr. Scott heard males singing as early as January 19, 1889, and February 7, 1890. The average number of eggs laid varies from eleven to thirteen. Mr. Menge has found as many as twenty-three in one nest, however. Two and probably three broods are raised in a season. The eggs resemble those of *Colinus virginianus* in every respect. The average size of twenty-three specimens is 30 by 24 millimetres, the largest measuring 31.5 by 24.5, the smallest 28.5 by 23 millimetres. None are figured.

## 3. Colinus virginianus texanus (Lawrence).

TEXAN BOB WHITE.

*Ortyx texanus* Lawrence, Annals Lyceum Natural History, N. Y., vi, April, 1853, 1.
*Colinus virginianus texanus* Stejneger, Auk, ii, January, 1885, 45.
(B 472, C 389*b*, R 480*b*, C 573, U 289*b*.)

Geographical range: Southern and western Texas, and northeastern Mexico north to western Kansas.

The Texan Bob White is a resident of the greater part of Texas, excepting the so-called Staked Plains in the northwestern part of the State. In eastern Texas it intergrades with *Colinus virginianus*. It is most abundant in the central parts of the State. Its range northward extends well into the Indian Territory and it has also been taken in western Kansas, where it is rare, however. In its general habits it does not differ materially from *Colinus virginianus*.

Capt. P. M. Thorne, Twenty-second Infantry, U. S. Army, writes me: "During a month I spent on the road between Forts Duncan and McIntosh, Texas, I found this species common, and so unsophisticated that a covey would not even squat when my dog pointed them; they would move on slowly, chattering to each other, evidently talking the matter over. At Fort Duncan it seemed odd that I could always find them mornings and evenings close to the bank of the Rio Grande on the American side, and as soon as flushed they flew straight over into Mexico. The river here is over half a mile wide. At Fort Clark, Texas, I have taken them nearly full grown on July 29, and found them barely able to fly as late as September 20."

Mr. George B. Sennett records them as common at Lomita, in the lower Rio Grande Valley, coming into the inclosures of the ranch at all times and feeding about the corncribs with Blackbirds and Pigeons.

Mr. William Lloyd, of Marfa, Texas, informs me, "The Texan Bob White is a bird of the lowlands, and is not found above an altitude of 2,000 feet. Their food consists of small berries, acorns, grain, buds and leaves of aromatic herbs and small shrubs, varied with occasional beetles, grasshoppers, and ants, especially the winged females, of which they seem to be very fond. They are very insuspicious, and their low notes, uttered while feeding, attract a good many enemies. I have seen foxes on the watch, and the Marsh Harrier perched in a clump of grass on the lookout, waiting for them to pass. But the many large rattlesnakes found here are their worst enemies. One killed in May had swallowed five of these birds at one meal; another, a female evidently caught on her nest and a half dozen of her eggs; a third, four Bob Whites and a Scaled Partridge. The young are also greatly affected and many killed by heavy rains in June and July; numbers perish then from cold and protracted wet weather. When alarmed by a Hawk sailing overhead they run under the mother for protection, as domestic chickens do."

Mr. J. A. Singley, of Giddings, Texas, writes me: "During the very hot weather of the summer this species is always to be found under the large

detached live oaks standing in the prairies. It is cool there in the hottest weather, and the birds know it. They are easily approached then, and are often killed by the dozen at such times by so-called sportsmen, though they are in poor condition and molting plumage. The favorite nesting site of the Texan Bob White is a bunch of sedge grass. A slight cavity is made in the center, this is lined with a few straws and arched over with similar material. Sometimes a covered way or tunnel leads to the entrance of the nest. Occasionally a nest is placed under a bush and not covered or arched."

Two broods are usually raised in a season, and even three at times. The average number of eggs to a set is about fifteen. Full sets of eggs have been found as early as May 3, and again late in September. Mr. Singley met with a covey of young just hatched September 22. He also found five eggs of this species in the nest of a domestic hen, not over 30 yards from the house. A nest with nineteen eggs when first found, contained ten additional ones five days later, proving conclusively that it was occupied by two birds. Only one incubated, however. Mr. H. P. Attwater found as many as thirty-three eggs in a nest of the Texan Bob White on May 14, 1889, near San Antonio, Texas. This set is now in the collection of Mr. Samuel B. Ladd, of Westchester, Pennsylvania. While examining this collection I was shown a very peculiar set of nine eggs, taken on May 16, 1889, by the above-mentioned collector, near the same place. These eggs, while of the usual shape and color, are all more or less spotted and streaked with pale reddish brown and lilac shell markings, principally about the larger end. The nest from which they were taken was found in a cornfield.

The eggs of the Texan Bob White are in no way different from those of *Colinus virginianus*. The average measurement of fifty-nine specimens in the U. S. National Museum collection is 30 by 24 millimetres; the largest egg measuring 31.5 by 24.5, the smallest 27.5 by 22 millimetres. On account of the similarity of these eggs to those of the preceding subspecies none are figured.

### 4. Colinus virginianus cubanensis Gould.

CUBAN BOB WHITE.

*Ortyx cubanensis* Gould, Monograph of the Odontophorinæ, 1850, Pl. 2.
*Colinus virginianus cubanensis* Ridgway, Manual North American Birds, 1887, p. 188. (B —, C —, R —, C—, U 289*c*.)

Geographical range: Cuba and southwestern Florida.

This slightly smaller and darker colored bird than *Colinus virginianus floridanus*, is found in limited numbers in southwestern Florida, south of Lake Okeechobee and Tampa Bay. Specimens from Miami, Dade County, on the east coast, are intermediate between this and the Florida Bob White. Dr. Jean Gundlach reports it as common on the Island of Cuba, and says: "It is not found at any time in the heavy forests, but along their outskirts, in the bushes and under-

growth. During the mating season the male perches on one of the lower branches of an isolated tree, or some other elevated position, and calls to the female. This note resembles its generic name '*Ortyx*' or '*Ortys*.' Another call is somewhat similar to the low grunting of the Guinea pig. Nidification begins in March and lasts till May. The female deposits about sixteen white eggs in a slight excavation of the ground, sparingly lined with grasses and always covered with overhanging plants."[1]

According to Dr. Juan Vilaró, professor of natural history, University of Havana, Cuba, "The Cuban Bob White lays from ten to eighteen eggs; these are usually deposited, between the months of April and July, in a slight cavity of the ground sheltered by vegetation. They feed on small fruits, seeds, and leafy shoots. The young, if alarmed, raise the feathers of the head and upper part of the neck, spread out the tail and wings a little, and run in various directions to hide, reassembling again in obedience to the call of the parent birds. The male assists in the duties of incubation. This bird is locally known as '*Codorniz*.'"

The average measurement of nine eggs in the U. S. National Museum collection from Cuba is 30.5 by 24 millimetres. The largest egg measures 31.5 by 25.5, the smallest 29.5 by 23.5 millimetres. They are indistinguishable from the eggs of the preceding subspecies, and none are figured on this account.

## 5. Colinus ridgwayi Brewster.

MASKED BOB WHITE.

*Colinus ridgwayi* Brewster, Auk, II, April, 1885, 199.
(B —, C —, R —, C —, U 291.)

Geographical range: Sonora, Mexico, and southern Arizona.

This species, only recently added to our avifauna, was first described by Mr. William Brewster in the Auk (Vol. II, 1885, p. 199), from a specimen taken by Mr. F. Stephens, August 11, 1884, about 18 miles southwest of the little town of Sasabe, in Sonora, Mexico. Fully a year previously, however, Mr. Herbert Brown, of Tucson, Arizona, obtained some of these birds within our border, which he sent East, where several ornithologists examined and pronounced them to be Grayson's Bob White (*Colinus graysoni*), a Mexican species, which proved to be a mistake, as the specimens sent were identical with the bird subsequently described by Mr. Brewster. The credit of discovering the Masked Bob White clearly belongs to Mr. Brown, and what little information we possess about its range within the limits of the United States and the habits of this species is principally due to his patient inquiry and personal investigation. He gives its range as follows: "The Masked Bob White is found in the country lying between the Barboquivari Range in Arizona and the Gulf coast in Sonora, more especially between the Barboquivari and the Plomoso, where this species is quite abundant. They are also found on the

[1] Journal für Ornithologie, Cabanis, 1856, p. 337.

Sonoita Creek, about 60 miles north of the Sonora line. From the Sonoita Valley they range in a westerly direction fully 100 miles, and through a strip of country not less than 30 miles in width within Arizona Territory. Very probably they may go beyond this, both to the east and west. The habits of the Masked Bob White, so far as we know them, appear to resemble very closely those of the common Quail, only slightly modified by the conditions of their environment. They utter the characteristic call of 'Bob White' with bold, full notes, and perch on rocks or bushes while calling. They do not appear to be a mountain bird, but live on the mesas (table lands) in the valleys, and possibly in the foothills.

"The Masked Bob White was, three years since, abundant in the neighborhood of Bolle's Well, a stage station on the Quijotoa road, near the northern end of the Barboquivari Range, 29 miles southwest of Tucson and about 40 miles north of the Mexican boundary line. As the station was then comparatively new the grass thereabouts was high and these Quail could be had for the taking; but now that the stock has eaten away the grass the birds have not for a year or more been seen about the place. On the road from Bolle's Well west to the Coyote Range (about 25 miles) these Quail were frequently to be met with, but the teamsters and travelers have killed or frightened them off. One of the former assured me that he had killed as many as five at one shot. Ten miles south of Bolle's, in the Altar Valley, we came across a small covey, perhaps a dozen in all. The bright deep chestnut breast plumage of the males looked red in the sun and gave the birds a most magnificent appearance. We secured but one, a male, the rest secreting themselves in the tall sacaton grass, which at this point was between 4 and 5 feet high, and as we had no dog we did not follow them. Our next place to find them was on the mesa southeast of the peak, where we camped to hunt for them, but they were scarce here, and we managed to secure but few.

"In addition to their 'Bob White' they have a second call of 'Hoo-we,' articulated and as clean cut as their 'Bob White.' This call of 'Hoo-we' they use when scattered, and more especially when separated toward nightfall. At this hour I noted, that, although they occasionally call 'Bob White,' they never repeated the first syllable, as in the daytime they now and then attempted to do. In body they are plumpness itself; in this respect, considering size, they overmatch the Arizona Quail (*Callipepla gambeli*) with which I compared them. In actual size of body, however, the latter is the larger. Of three stomachs of this species examined, one contained a species of mustard seed, a few chaparral berries, and some six or eight beetles and other insects, ranging in length from a half inch down to the size of a pin head. The second was similarly provided, but contained, in lieu of mustard seed, a grasshopper fully an inch in length. These two were taken on the mesa. The third, from a bird taken in the valley, contained about twenty medium-sized red ants, several crescent-shaped seeds, and a large number of small, fleshy, green leaves."[1]

[1] Extracted from "Arizona Quail Notes," Forest and Stream, December 31, 1885. The name of "*C. ridgwayi*" is substituted by me for *C. graysoni*, where used in above article.

Lieut. H. C. Benson, Fourth Cavalry, U. S. Army, found the Masked Bob White fairly abundant near Campos and Bacuachi, Sonora, securing a number of specimens in the summer of 1886, and he writes me that they only frequented cultivated fields there, where wheat and barley had been raised. He also found another species of Partridge associated with these birds near Campos, which probably crosses our border also. This Partridge was recently described by Mr. R. Ridgway, in Forest and Stream of March 3, 1887, and named "*Callipepla elegans bensoni*," in honor of its discoverer.

Nothing positive has been known about the nest and eggs of the Masked Bob White till the present season, though one of their nests containing six eggs was found some years ago. They were allowed to remain in hope of seeing the number increased, and when visited at another time they had hatched. The nest as described to Mr. Brown was a shallow excavation alongside a tuft of grass. The eggs were white and unspotted. In the spring of 1890 Mr. Brown succeeded in obtaining one of these eggs cut from the oviduct of the female, as well as a set of eleven eggs said to belong to this species. These eggs were found early in May in a similar situation in the vicinity of Arivaca. The egg of the Masked Bob White is white, unspotted, subpyriform in shape, and their average measurement is 31 by 25 millimetres.

Since the foregoing was written, Mr. Otho C. Poling writes me from Fort Huachuca, Arizona, as follows: "I first met with the Masked Bob White on May 24, 1890, in a series of low foothills extending off to the northwest of the Huachuca Mountains, and ending in a somewhat higher range of hills called the Canella Range, being the northwestern termination of the Huachucas. Most of these hills are thickly grown up with juniper, cedar, manzanita, stunted oaks, pines, and with a heavy growth of grass. While riding along one of these grassy ridges I flushed what I supposed was a "Fool Quail," *Cyrtonyx montezumæ*. I at once staked my horse, and on shooting the bird I found it to be a male of the Masked Quail. I continued the search and had spent a half hour or more, when, as I passed within 2 feet of a mescal plant, *Agave americana*, I suddenly flushed the female from underneath it. I first shot her and then expected to find the nest; but after searching for several hours and failing, I gave it up. The female contained an egg which was fully developed and would probably have been laid within half an hour. I searched for the nest of this species on the two succeeding days as well, but made no further discoveries. The single egg of *Colinus ridgwayi* obtained by me is pure white and measures 31 by 24 millimetres.

"The Canella Range is about 25 miles north of the Mexican border. Two more specimens of the Masked Quail, both females, were shot about June 10, in the Huachuca Mountains, near the middle of the range, at an elevation of about 6,000 feet. The birds were found in a cañon about 15 miles north of the border, on the northeastern slope of the range."

From the foregoing it would appear that the Masked Bob White is confined to a narrow strip of country along our southwestern border, and is nowhere as

common as the Gambel's and Scaled Partridges, which are found in the same regions. The eggs appear to be indistinguishable from those of the eastern Bob White, and no specimen is figured on that account.

## 6. Oreortyx pictus (Douglas).

MOUNTAIN PARTRIDGE.

*Ortyx picta* Douglas, Transactions of the Linnæan Society, xvi, 1829, 143.
*Oreortyx pictus* Baird, Birds of North America, 1858, 642.
(B 473, C 390, R 481, C 574, U 292.)

Geographical range: Pacific coast districts, from Santa Barbara, California, north to Washington.

This handsome bird is the largest of the American Partridges. It is better known on the Pacific coast by the name of "Mountain Quail." Its range is not an extensive one, as it is only found along the western slopes of the Coast Range in California from about latitude 34° northward, and throughout western Oregon, where it has a slightly more easterly range than in California, typical specimens having been taken near Mount Hood. In regard to its occurrence in the new State of Washington, Prof. O. B. Johnson, of the University of Washington, Seattle, Washington, writes me as follows: "Twenty years ago this species was found but little north of the Willamette Valley, Oregon, but they gradually worked down the south side of the Columbia River toward Astoria, and in 1872 I was informed that some of these birds, shot at Kalama, Washington, were the first seen north of the Columbia. A crate of trapped birds sent to the Seattle market, were some time afterward purchased by the Young Naturalists' Society and set free. These have since multiplied nicely, and others have been sent to Whitby Island, 40 miles north of Seattle, where, I understand, they are also doing well. A covey wintered in a barn lot with the hens, just at the outskirts of Seattle this winter."

It is only within the last twenty years that this Partridge has obtained a permanent footing in Washington, and while a few birds may have crossed the Columbia River near Kalama, the majority were introduced, quite a number having been liberated near Vancouver Barracks and other localities as well. This species is affected by climatological conditions, and is only to be found in the moist mountainous regions along the coast, where the rainfall is heavy. In the dryer regions of the interior it is replaced by a paler race, *Oreortyx pictus plumiferus*.

The Mountain Partridge is a constant resident wherever found, and is quite common in portions of its range, especially about Fort Gaston, California. Its habits are similar to those of the Plumed Partridge, which will be more fully described. Professor Johnson writes me, "the males have a sharp challenge note, which they utter with the beak pointing straight up and with wings dropped, while standing on a fencepost, broken limb, or upturned root. It is a

sharp whistle of but one note, and may be imitated by whistling the word "querk" in middle E, and is audible for a long distance."

Nidification commences about the middle of May, and ordinarily but one brood is raised. The nest is placed on the ground, alongside or under an old log, or on side hills under thick bushes and clumps of ferns, occasionally along the edges of clearings, grain fields, or meadows. A nest found May 27, 1877, near Coquille, Oregon, containing six fresh eggs, was well concealed under a bunch of tall ferns, in a tract of timber killed by a forest fire. Another, taken in Ukiah Valley, Mendocino County, California, June 2, 1883, by Mr. C. Purdy, contained twelve fresh eggs. This nest was found under a bush of poison oak among a lot of dry leaves on a steep hillside. The average number of eggs laid by this Partridge is about ten, most of the sets containing from eight to twelve. An occasional nest contains as many as sixteen, but such large sets are rare.

The eggs vary from a pale cream color to a rich creamy buff, and are unspotted. In shape they are short ovate, and very much resemble unmarked eggs of the Ruffed Grouse although of smaller size. They are indistinguishable in shape, size, and color from the eggs of the next subspecies, and for that reason none are figured. The average size of nineteen specimens in the U. S. National Museum collection is 34.5 by 26 millimetres, the largest egg measuring 36 by 26.5, the smallest, 34 by 25 millimetres.

## 7. Oreortyx pictus plumiferus (Gould).

PLUMED PARTRIDGE.

*Ortyx plumifera* Gould, Proceedings Zoölogical Society, 1837, 42.
*Oreortyx pictus* var. *plumiferus* Ridgway, in History North American Birds, III, 1874, 476.
(B —, C —, R 481*a*, C —, U 292*a*.)

Geographical range: From the west side of the Cascade Range in northern Oregon (except near the coast) south, along both sides of the Sierra Nevada and the southern coast ranges of California (south of latitude 34° only) to northern Lower California.

The Plumed Partridge, a bird as handsome as the preceding, inhabits the interior mountain regions from the southern border of California northward through middle western Oregon, as well as parts of western Nevada, approaching the seacoast in the extreme southern portion of its range only. It is everywhere known as the "Mountain Quail," and deserves this name far more than the preceding subspecies, reaching much higher altitudes than the former. On the eastern slopes of the Sierra Nevada it has been observed from Walker's Pass, near Fort Tejon, northward. Personally, I have often met with it on Mount Kearsarge, in Inyo County, California, where it reached an altitude of 10,000 feet in summer. Mr. Robert Ridgway noticed this subspecies near Carson City, and in the Comstock Mountains near Pyramid Lake, Nevada,

and Dr. A. K. Fisher obtained it in the Argus Range of mountains in southeastern California, the most easterly known point of its range. It is essentially a bird of the mountains, where it is more partial to the open pine forests and rocky ridges, covered with chaparral and undergrowth, than to the densely timbered portions of the ranges. I have always found it a shy and retiring bird, usually to be found only in small coveys, and on being alarmed trusting more to the legs than wings for escape. While equally abundant on both sides of the Sierra Nevada, and common enough on the western slopes of the Cascade Mountains in Oregon, it does not seem to occur on the east side of the latter range; at any rate no specimens have been brought to the notice of naturalists from such localities, and as far as known to me, unless recently introduced, it does not occur in Washington. It is a resident and breeds wherever found, excepting in the higher portions of the mountains frequented as summer haunts, from which the birds retire on the approach of winter.

Mr. Charles A. Allen, of Nicasio, California, a careful and trustworthy observer, writes me as follows: "I find this Partridge all through the Sierras. In the spring many go up to the snow line, returning in the fall below the point of snowfall. These vertical migrations are performed *entirely on foot*, unless streams must be crossed, when they take to their wings, but alight at once on gaining the opposite side, and continue their travels on foot."

The mating season begins in the latter part of March and the beginning of April, according to latitude and altitude. The call note of the male is a clear whistle, like "whu-ié-whu-ié," usually uttered from an old stump, the top of a rock, or a bush. When alarmed, a note like "quit-quit" is used. In the higher mountains but a single brood is raised; but in the lower foothills they rear two broods occasionally, the male caring for the first one while the female is busy hatching the second.

I met with a brood of young birds, perhaps a week or ten days old, near Jacksonville, Oregon, on June 17, 1883. The male, which had them in charge, performed the usual tactics of feigning lameness, and tried his very best to draw my attention away from the young, uttering in the mean time a shrill sound resembling "Quaih-quaih," and showed a great deal of distress, seeing I paid no attention to him. The young, already handsome and active little creatures, scattered promptly in all directions, and the majority were most effectually hidden in an instant. As nearly as I was able to judge they numbered eleven. I caught one, but after examining it turned it loose again. The feathers of the crest already showed very plainly.

Their food consists of insects, the buds and tender tops of leguminous plants, small seeds, and berries of various kinds. The nest, simply a slight depression in the ground scratched out by the bird, and lined perhaps with a few dry leaves, pine needles, grasses, and usually a few feathers lost by the hen while incubating, is sometimes placed alongside an old log, at other times under low bushes or tufts of weeds, ferns, and, when nesting in the vicinity of of a logging camp, a favorite site is under the fallen tops of pine trees that

have been left by wood-choppers, the boughs of which afford excellent cover for the nest.

Mr. L. Belding found a deserted nest of this species in a cavity of the trunk of a standing tree near Big Trees, California, but in this locality they nest oftener in thickets of the rock rose or the tar-weed, and according to his observations they do not desert their nests for slight cause, like the Bob White or the California Quail. The eggs vary from eight to fourteen in number, averaging usually about eleven, and are indistinguishable from those of the preceding subspecies. They are generally more or less stained by contact with the lining of the nest and the soil.

Mr. Loren W. Green, of the U. S. Fish Commission, reports the Plumed Partridge as quite common near Baird, Shasta County, California, and he found a nest containing nineteen eggs, seeing also a brood of twenty young birds. In that vicinity they raise two broods a season. The earliest date on which eggs were found by him was April 15, and the latest August 15. Occasionally a nest is placed on top of old decayed tree stumps. Rattlesnakes are very common in this locality, and these birds have adopted such sites, probably from the fact that they afford them better protection from such enemies. A nest taken by Mr. Green on May 24, 1886, near Redding, California, contained twelve fresh eggs; these were placed in a slight excavation on a hillside under a small bush, and well concealed from view. Another, found May 5, 1885, in the Volcan Mountains, San Diego County, California, by Mr. F. W. Paine, at an altitude of about 5,000 feet, contained eight slightly incubated eggs. It was placed among a lot of dry leaves in a pine and fir forest.

Mr. A. M. Ingersoll, of San Diego, California, found a nest of the Plumed Partridge containing ten eggs, under a mass of excelsior and other shavings that had lodged against a brace of a snowshed, less than 15 feet from the railroad track on the Union Pacific Railroad in the Sierra Nevada Mountains.

Mr. F. Stevens found a full set of eggs of this subspecies in southern California as early as April 7.

The ground color of the eggs of the Plumed Partridge varies from pale cream to a reddish buff, and in shape they are short ovate. Incubation lasts about twenty-one days, and an egg is laid daily until the set is complete. The shell is smooth and slightly glossy, and usually more or less stained by contact with the lining of the nest or the soil.

The average measurement of sixty-six specimens in the U. S. National Museum collection is 34.5 by 26.5 millimetres. The largest egg of the series measures 38 by 28, the smallest 32 by 25.5 millimetres. The type, No. 10049, (Pl. 1, Fig. 3), selected from a set of ten eggs, is one of the darkest colored specimens; it was taken June 7, 1866, near Downieville, California, by Mr. William Veille. No. 18187 (Pl. 1, Fig. 2), one of the palest colored specimens of the series, showing the other extreme, was collected by Mr. L. Belding, June 10, 1880, in Bear Valley, Alpine County, California. This nest had been abandoned and contained only six eggs when found.

## 8. Oreortyx pictus confinis Anthony.

SAN PEDRO PARTRIDGE.

*Oreortyx pictus confinis* Anthony, Proceedings California Academy Sciences, 2d ser., II, October 11, 1889, 74.
(B —, C —, R —, C —, U 292*b*.)

Geographical range: San Pedro Mountains, Lower California (and southward ?).

This recently described subspecies differs from *Oreortyx pictus plumiferus* in its grayer upper parts and thicker bill.

Mr. A. W. Anthony, who discovered this new race, writes me that the breeding range of the San Pedro Partridge extends from the foothills along the base of the San Pedro Mountains, Lower California, to the tops of the highest peaks, estimated at about 12,500 feet. It is not common below an altitude of 2,500 feet. He says: "The first call notes are heard about the last of February, a soft-tuned, far-reaching 'chay-chay,' as mellow and sweet as the notes of a flute. The alarm note when surprised is a soft, loud, 'ch-ch-ch-e-e-ea, ch-e-e-ea,' which, as the danger becomes more evident, becomes harder, sounding like 'kee-kee-ke-ea,' which is taken up by each member of the covey as they gradually draw away, and long after the last of the band has disappeared the soft chorus floats back from the mazanitas and lilacs which clothe the hills where this subspecies is found. Frequently a loud 'pit-pit' is heard as they take wing, but they are more silent when on the wing than *Callipepla californica*. A few pairs bred about my camp at Valladares Creek, 6 miles from the base of the range and about 2,500 feet above the sea level, but nearly all of the flocks that wintered along the creek at this point disappeared by March, leaving only an occasional pair, which sought the shelter of the manzanitas high up on the hillsides, from whence their clear, mellow notes were heard morning and evening, so suggestive of cool brooks and rustling pines, but so out of place in the hot barren hills of this region.

"The only eggs I have taken were found at my camp on the Valladares Creek, March 29, 1889. The nest, placed in the midst of thick manzanita chaparral high up on a hillside having a northern exposure, consisted of a mere hollow under a manzanita bush, lined, or rather filled, with dry leaves of the lilac and manzanita, and contained but a single egg. The female, which I shot as she left the nest, was about to deposit a second, which I secured upon skinning her." Mr. Anthony further states that the eggs of the San Pedro Partridge resemble those of the Plumed Partridge in shape and color, being creamy white and unspotted. The two specimens measure 36 by 28 and 37 by 27 millimetres, respectively.

## 9. Callipepla squamata (Vigors).

SCALED PARTRIDGE.

*Ortyx squamatus* Vigors, Zoölogical Journal, v, 1830, 275.
*Callipepla squamata* Gray, Genera of Birds, III, 1846, 514.
(B 476, C 393, R 484, C 577, U 293.)

Geographical range: Northern Mexico and contiguous border of United States, from western Texas, through New Mexico, to southern Arizona.

The Scaled Partridge, usually called the Blue Quail and also the White Top-knot Quail, is a constant resident of southwestern Texas from about latitude 28° northward along the valley of the Rio Grande, as well as of a considerable portion of New Mexico and southern Arizona, extending south into Mexico. Specimens have been taken as far north as Chico Springs, Colfax County, New Mexico, where Mr. Thurlow Washburne reports them as fairly common in rocky places wherever water is found. Bonham, Fannin County, Texas, is the most eastern point at which it has been noted, and in Arizona the mountains in the vicinity of the Colorado River probably mark its western boundary. It has been traced at least 90 miles west by southwest from Tucson to Wood's Station, and probably extends still further west in this direction. It does not appear to occur north and east of the White and Mogollon Mountains. They are very common in some portions of southern Arizona. Mr. Herbert Brown writes me from Tucson as follows: "I have seen this bird, both far away from, and in the immediate vicinity of, water, on the open valleys and plains, and also in the rough foothills of the mountains. In the Altar Valley, west and southwest of Tucson, I have seen large numbers of them, but as the foothills of the mountains are approached they give way to Gambel's Quail entirely. They are also at all times very numerous in the Sierritas about 50 miles south of Tucson, as well as west of the Catalina Mountains."

According to my own observations the Scaled Partridge is found most abundantly on the high plateaus bordering on the principal streams of the regions under consideration, reaching an altitude of from 1,500 to nearly 7,000 feet. It shuns timbered country, and in southern Arizona, where I have frequently met with these birds, they seemed to me to prefer the most barren and driest portions of that scantily watered Territory. I invariably found them back in the foothills and mesas, from 2 to 5 miles distant from the river beds, which are generally dry for the greater part of the year.

These barren and rocky foothills and table lands are covered in places with a dry, harsh vegetation, consisting of different species of cacti, stunted yuccas, catclaw-mimosa, creosote, and dwarf sage bushes, where the soil is so parched that scarcely anything else will flourish, and where nearly every shrub is covered with sharp spines or thorns; such places I found to be the favorite home of the Scaled Partridge. Many times have I seen coveys miles from water, and it appeared to me that, judging from the kind of country it inhab-

its by preference, this universally needed fluid was scarcely required by these birds. From the repelling nature of the country it generally frequents it is naturally hunted very little; still, I found them exceedingly shy and wary and very difficult to approach, far more so than Gambel's Partridge. It prefers to trust to its legs for escape almost entirely, and is generally successful, being an expert and swift runner, dodging in and out among the bushes with great ease and dexterity, consequently they are soon lost to sight. The covey generally follow a leader, Indian-file fashion. Their habits seem, however, to differ somewhat in other sections.

Mr. E. W. Nelson furnishes me with the following observations about this species: "In New Mexico I have found the Scaled Partridge abundant on the Jornada del Muerto, and thence north along the valley of the Rio Grande to the vicinity of Santa Fé and Cañoncito. Near the latter place the birds occur sparingly in the lower portions of the cedar and piñon belt, but as a rule the Scaled Partridge is preëminently a species of the open arid plains.

"In many instances I have found them far from water, but they make regular visits to the watering places. On the Jornada del Muerto and on Santa Fé Creek I found them frequenting the open plains, away from the water in the middle of the day, and in the vicinity of the water late in the afternoon. At this time they are often seen in company with Gambel's Quail amongst the bushes and coarse grass or weeds bordering the water courses. They are very difficult to flush, owing to the rapidity with which they run through the bushes or other vegetation. When flushed, they scatter and only fly a short distance, when they alight and run on as before. As soon as the alarm is over the old birds reunite the flock by a low call note.

"The latter part of summer and early fall they gather into coveys, often containing several broods, as I observed in 1882, in the valley of the Gila River, near Clifton, Arizona. At this season they frequented the low bare hillsides, or the now dry water courses and the fields adjoining these, associating with Gambel's Partridge. They are easily trapped in the fall and winter, and many are caught by the natives and taken to the markets of the larger towns of New Mexico and Arizona."

Mr. William Lloyd writes me from Marfa, Texas, as follows: "The Blue Quail loves a sandy table land, where they spend considerable time in taking sand baths. I have often watched them doing so, pecking and chasing each other like a brood of young chickens. Good clear water is a necessity to them. They are local, but travel at least 3 miles for water. In the evenings they retire to the smaller ridges or hillocks and their calls are heard on all sides as the scattered covey collects. Several times I have seen packs numbering sixty to eighty, but coveys from twenty-five to thirty are much oftener noticed. The mating season begins sometimes as early as March, and after the female commences laying, generally about six weeks later, the male at about sundown every fine evening, mounts a convenient bush or rock and calls his mate, which approaches noiselessly and they disappear together.

The young are wary, and crouch in or under the smallest tufts of grass, while the parents remain in full sight. During the middle of the day they frequently alight in trees, usually large oaks, but they roost on the ground at night."

Mr. A. W. Anthony says: "I think this species, like *Callipepla californica vallicola*, is largely influenced by the seasons in regard to its nesting, although perhaps not to the same extent. In southwestern New Mexico the season of 1886 was a very dry one, no rain falling during the spring and but very little during the preceding winter. As a consequence the vegetation of the deserts was unusually scarce. The Scaled Partridges remained in flocks till very late, and in many cases did not break up at all. Young birds were very scarce during the fall, and none were noted, I think, till after August 10. The only nest that came under my notice that season was taken on July 31. It was located on a high, rocky hillside, in a slight hollow between two rocks, and slightly lined with dry grass. A large dead *Agave* (American aloe) had fallen over the nest, hiding it so effectually that its discovery was accidental, the female being flushed by my brushing against the dry leaves of this plant. It contained eight fresh eggs. I have taken chicks not over two weeks old in Grant County, New Mexico, as late as October 10, while young of the year taken the same day could not be distinguished from the adults by the closest scrutiny."

I believe two and even three broods are occasionally raised in a season, the male assisting in the care of the young, but not in incubation. This lasts about twenty-one days. Full sets of the eggs of the Scaled Quail have been taken early in April and others late in September. The nest is always placed on the ground, as far as known, usually under the shelter of a yucca or small bush, overgrown with grama grass, and in the Rio Grande Valley, New Mexico, occasionally in a wheatfield. In southern Arizona Mr. O. C. Poling has found the Scaled Partridge nesting in corn and grain fields, in alfalfa meadows and potato patches, as well as on almost barren flats, where only a few scattering bushes but a few inches high grew. Here the nesting season began about May 1, and eggs were found as late as July 15.

Their food consists of small seeds, grain when procurable, berries of various kinds, the tender tops of plants, small beetles, ants, and grasshoppers. A young female of this species, probably about ten days old, and taken by Mr. Herbert Brown in Altar Valley, Arizona, September 27, 1885, may be described as follows: Upper parts chestnut-brown, each feather with medial T-shaped white markings. Tail-feathers ashy, barred with alternate pale black and white bars. Upper parts of the breast buffy-grayish, each feather about the neck with a V-shaped lighter area. Belly rusty buff, transversely barred with brown. Sides of head reddish buff, crest brownish, each feather with a narrow medial stripe of white.

According to Mr. Lloyd their call note sounds something like a lengthened "chip-churr, chip-churr;" the same, only more rapidly repeated, is also given when alarmed, and a guttural "oom-oom-oom" is uttered when wor-

ried or chased by a Hawk. The young utter a plaintive "peep-peep," very much like young chickens. Like the rest of the Partridge tribe they are able to run about as soon as hatched.

Mr. W. H. Cobb, of Albuquerque, New Mexico, informs me "that in this part of the Territory this species is a sort of semi-migrant. The greater portion of the birds move to the higher mesas and foothills of the mountains to breed, and during the cold weather return to the river bottoms where, in favorable localities, a few remain throughout the year."

Mr. W. E. D. Scott found this species in great abundance in a little valley west of the Santa Catalina Mountains, which the road from old Camp Grant to Tucson, Arizona, crosses. Here, he says, they associated with Gambel's Quail, apparently on the most friendly terms.

The number of eggs to a set ranges usually from nine to sixteen, generally about eleven or twelve, and an egg is deposited daily. Occasionally a larger set is found. The shells of these eggs are very thick and without lustre. The ground color varies from a very pale creamy white to a pale buff. The markings are sharp and well defined in most cases, varying from mere pin points, scarcely perceptible to the naked eye, to the size of No. 12 shot. These spots are usually round and of equal size, and pretty evenly distributed over the entire egg. Occasionally a set is marked with somewhat more irregular, as well as larger, spots or blotches, resembling certain types of eggs of *Callipepla gambeli*, but these markings are always paler colored and not so pronounced. They vary in color from a pale reddish brown or ochraceous to a vinaceous buff and fawn color in different sets.

The average measurement of twenty-eight specimens in the U. S. National Museum collection is 32.5 by 25 millimetres; the largest egg of the series measuring 34 by 27, the smallest 30.5 by 25 millimetres. In shape they vary from short ovate to subpyriform.

As there is practically no difference in the eggs of this species and of the Chestnut-bellied Scaled Partridge, the eggs figured as typical of the latter would also answer for the present species under consideration. If there is any difference it seems to be in size only, and even this is doubtful.

The type specimen, No. 23165 (Pl. 1, Fig. 4), selected from an incomplete set of six eggs, was collected by First Lieut. H. C. Benson, Fourth Cavalry, U. S. Army, near Fort Huachuca, Arizona, August 6, 1886, and represents one of the palest colored eggs of the series.

No. 23776 (Pl. 1, Fig. 5), from a set of twelve eggs collected by Lieut. M. H. Barnum, Third Cavalry, U. S. Army, near Marathon, Texas, June 22, 1889, represents one of the heavier marked eggs of this species, and the remaining two types figured under the next subspecies are still better marked and represent the extremes.

## 10. Callipepla squamata castanogastris Brewster.

CHESTNUT-BELLIED SCALED PARTRIDGE.

*Callipepla squamata castanogastris* Brewster, Bulletin Nuttall Ornithological Club, VIII, January, 1883, 34.
(B —, C —, R —, C —, U 293*a*.)

Geographical range: Lower Rio Grande Valley in Texas, south to San Luis Potosi, eastern Mexico.

This well-marked subspecies is easily distinguished from the Scaled Partridge, being a much richer and darker colored bird than the latter. Its range seems to be a very restricted one, and is confined to the Lower Rio Grande Valley in Texas and eastern Mexico. It has been taken near Fort Brown, Texas, by Asst. Surg. James C. Merrill, U. S. Army, where it is rare, and it extends northwestward from this locality at least to Eagle Pass, Texas. According to Mr. George B. Sennett, the foothills of the Rio Grande, about 100 miles back from the coast, mark the eastern limit of this bird.

"Mr. C. W. Beckham reports this subspecies from Mineral City, about 50 miles northwest from Corpus Christi, Texas."[1]

According to Mr. J. A. Singley, it seems to be very common about Ringgold Barracks and Rio Grande City, Texas, from which points it does not extend more than 50 miles into the interior. He reports them as abundant in the hilly country near Rio Grande City, and at the Las Cuevas Rancho, 15 miles south, and as rare at and below Hidalgo, Texas.

The general habits of the Chestnut-bellied Scaled Partridge as well as its food are very similar to those of the preceding subspecies. The mating and nesting season, however, commences somewhat earlier. Full sets of eggs have been taken near Rio Grande City, and at Camargo on the Mexican side of the river opposite, as early as March 11, and from that time up to July 10. Two broods are unquestionably raised in a season. Mr. Thomas H. Jackson, of West Chester, Pennsylvania, gives the average number of eggs laid by this species as fifteen, based on data taken from twenty-seven sets. The largest number found in one nest was twenty-three. I am indebted to him, as well as to Mr. George B. Sennett, for the loan of a number of specimens for examination. Their nests are always placed on the ground; a slight hollow in the sand is scratched out by the bird, usually under a clump of weeds or grass, or a prickly-pear bush. They are very slightly lined with dry grasses. The shape and color of their eggs are very similar to those of *Callipepla squamata*.

From the material before me it would appear that more of the eggs of this subspecies are plainly and distinctly spotted than is the case with the former, and they also average a trifle smaller. The average measurement of seventy-seven specimens examined is 31 by 24 millimetres. The largest egg of the series in

[1] Proceedings U. S. National Museum, Vol. x, 1887, p. 656.

the U. S. National Museum collection measures 34 by 25, the smallest 25 by 21 millimetres.

The type specimen, No. 24021 (Pl. 1, Fig. 7), selected from a set of thirteen eggs, was taken June 21, 1890, near Camargo, Mexico, and purchased from Mr. Thomas H. Jackson, of West Chester, Pennsylvania.

An egg (figured on Pl. 1, Fig. 6), from a set of fifteen collected near Rio Grande City, Texas, was borrowed from, and is now in the collection of, the above-mentioned gentleman. These two eggs represent the heavier marked types, others resemble the two eggs figured under the preceding subspecies so much that they are practically indistinguishable. Specimens marked like the four eggs figured can be found among the eggs of either subspecies.

## 11. Callipepla californica (Shaw).

CALIFORNIA PARTRIDGE.

*Tetrao californicus* Shaw, Naturalists' Miscellany, 1797 (?), Pl. cccxlv.
*Callipepla californica* Gould, Monograph Odontophorinæ, 1850, Pl. xvi.
(B 474, C 391, R 482, C 575, U 294.)

Geographical range: Coast region of California, Oregon, Washington, and Vancouver Island, British Columbia.

This handsome and well-known western game bird, commonly called Valley or Top-knot Quail, is an inhabitant of the coast region of California from about latitude 34° northward along the coast of Oregon, the new State of Washington, and some of the islands adjacent thereto, including Vancouver Island, British Columbia. In Washington and the islands of Puget Sound it was originally introduced, however, and according to Dr. Suckley, one of the pioneer naturalists of the Northwest coast, this was first done by Governor Charles H. Mason and Mr. Goldsborough as early as 1857, when two lots were turned out on the prairies near Puget Sound, and by the following winter they had increased largely.[1]

Prof. O. B. Johnson, of Seattle, Washington, states: "This species is very common now on Whitby Island, in Puget Sound, which seems to be especially suitable to these birds, owing to the extensive prairies and open oak parks found thereon."

Their favorite haunts are the undergrowth and thickets along water courses, brush-covered side hills, and cañons, frequenting the roads, cultivated fields, vineyards, and edges of clearings to feed. It is a constant resident, and breeds wherever found.

The mating time commences early in March, sometimes later, depending on the season. Then the large packs into which this species gathers in the fall of the year break up gradually, each pair of birds selecting a suitable nesting site. In the more densely settled portions of California this Partridge is by no means as common now as it was a decade ago, when it was not unusual to

[1] History North American Birds, 1874, Vol. III, p. 481.

see packs numbering five hundred and more together, while now, at least near the larger cities, coveys even of fifty birds are rarely seen. In localities where not constantly harassed and hunted the California Partridge becomes surprisingly tame and confiding, in fact almost domesticated; and under such circumstances many nest close to houses and outbuildings and in the shrubbery of gardens adjoining human habitations.

Mr. Charles A. Allen, of Nicasio, Marin County, California, writes me as follows: "I found a nest of this species under a bunch of Snowberry bushes (*Symphoricarpus*), not 30 feet distant from my house, containing twenty-one eggs. I watched this nest daily, and two weeks after finding it the eggs hatched. The female was still on the nest, and the little heads of the young were peeping out all around her. They became very tame, ran all around the yard, and took but little notice of the members of my family when going among them. I think the average number of eggs laid by this species is about fourteen. While the female is incubating, the male usually mounts some old stump, a dead limb, or fencepost in the vicinity of the nest, and every few seconds utters a long-drawn note not unlike 'whāā-whāā.'"

Mr. W. Otto Emerson, of Haywards, California, states: "I have never known the male to assist in the duties of incubation, but he will make his appearance twice a day near the nesting site. First at break of day, when he gives his call note, "kuck-ku, kuck-ku;" the female then comes off to feed an hour, and the same is repeated at dusk. During the past summer, 1889, I found a nest of this species in a pile of brush in the chicken yard, and in May, 1880, a nest was found in a similar situation, within 15 feet of our front door. Both carriages and persons were passing nearly every hour within 4 feet of this nest, and the bird was frequently disturbed, but did not seem to mind it much. Another nest was placed in the short grass alongside of a highway, with nothing at all to conceal it. The food of the downy young consists of insects, small seeds of various plants, and chickweed. When alarmed, the old bird gives one or two notes of warning and flies away. The young, when still too small to fly, hide quickly under anything in the shape of a leaf or in the grass, and lie close to the ground till the danger is passed, when they are called together again by the parent."

The nest of the California Partridge is but a very flimsy affair at best. Any place alongside of a rock, log, or an old stump, under a pile of brush, small bush, or a bunch of weeds or grass will answer. Occasionally the eggs are laid in a perfectly open situation without any attempt at concealment whatever, and now and then a hen's nest in the chicken house is used for this purpose. The site once selected, and it does not seem to be a difficult matter to please them in this respect, a slight hollow is scratched out by the bird, and this is sparingly lined with any convenient material near at hand, usually bits of grass. As incubation advances a few feathers drop from the setting hen and work in among the eggs. These, I believe, are constantly turned and rearranged from day to day. Incubation is variously stated to last from

twenty-one to twenty-eight days. I believe the first-mentioned period is nearer correct.

Mr. Walter E. Bryant, well known as an excellent ornithologist, writes as follows regarding some unusual nesting sites of the California Partridge: "Essentially a ground-building species, but several cases have come under my notice of its nesting in trees, upon the upright end of a broken or decayed limb, or at the intersection of two large branches. A few years ago a brood was hatched in and safely conducted away from a vine-covered trellis at the front door of a popular seminary. How the parents managed to get the tender young down to the ground is not known."[1]

The young run about as soon as hatched. Usually but one brood is raised, occasionally two. In the latter case the male takes charge of the young when they are about three weeks old, the female then laying the eggs for the second. Downy young have been observed as early as May 20 in the southern portions of their range, and some broods are undoubtedly hatched still earlier. In the fall, when the young are full grown and able to shift for themselves, they collect in large packs, a number of coveys associating together until spring. They are much shyer then and more difficult to approach. The usual call note, when one of these packs become scattered, is a rather unmusical "ca-āpe, ca-āpe," the last syllable drawn out; another note, like "kā-kāāh," is also used on such occasions.

From twelve to sixteen eggs seems to be the average number laid. The largest number found in a nest of which I have any reliable record is twenty-one, but undoubtedly more are occasionally found when two hens lay in the same nest. Their ground color is usually creamy white, but now and then a decidedly buff-colored set is found. The markings vary from fine dots, usually well rounded and of various sizes, to irregular outlined spots and blotches of different shades of dark chestnut brown, olivaceous drab, and golden russet, generally pretty evenly scattered over the entire egg. In shape and thickness of shell they resemble the eggs of *Colinus virginianus*.

The average measurement of forty-eight specimens in the U. S. National Museum collection is 32 by 25 millimetres. The largest egg of this series measures 35 by 26, the smallest 30 by 24 millimetres.

Of the three type specimens figured, which are selected to show the variations and different styles of markings, Nos. 17922 and 21109 (from the Bendire collection) were obtained near Santa Cruz, California, on June 13, 1874, and July 21, 1877 (Pl. 1, Figs. 8 and 10), and No. 23912 (Pl. 1, Fig. 9) was taken near Haywards, California, on April 21, 1883, by Mr. W. Otto Emerson.

[1] Bulletin California Academy of Sciences, II, 1887, p. 451.

## 12. Callipepla californica vallicola Ridgway.

VALLEY PARTRIDGE.

*Callipepla californica vallicola* Ridgway, Proceedings U. S. National Museum, viii, 1885, 355.
(B —, C —, R —, C —, U 294*a*.)

Geographical range: From western and southern Oregon, except near the coast, south through western Nevada and the interior of California to Cape St. Lucas, Lower California.

This race, a paler and grayer-colored bird than the preceding, is an inhabitant of the drier interior valleys and foothills of the mountains ranging from Cape St. Lucas, Lower California, throughout central California east of the Coast Range, through western Oregon. It occurs on both sides of the Sierra Nevada, at least as far north as the head of Owen's River, and eastward to the western border of Death Valley, California, where I met with this subspecies in 1867. In southeastern California, according to Dr. Elliott Coues, "It reaches nearly to the Colorado River, following along the course of the Mojave to the spot where it sinks in the desert, there meeting the western extension of the range of *Callipepla gambeli*."[1]

In southwestern Oregon it does not appear to occur anywhere on the eastern slopes of the Cascade Mountains, north of Fort Klamath, unless recently introduced. It is common in the upper and middle parts of the Willamette Valley, while in the lower part of this valley it intergrades with *Callipella californica*. It has been transplanted to Utah, in the vicinity of Ogden, as well as in various parts of Nevada, where it is now found in suitable localities along the entire western border of this State, from Carson and Reno, along the west shore of Pyramid Lake, to the northern end of Warner Valley, Oregon. It is a resident and breeds wherever found. A few years ago the Valley Partridge was exceedingly abundant about Fort Bidwell, in the extreme northeastern part of the State of California.

Mr. A. C. Lowell writes me from there as follows: "These birds are unable to stand the severe cold of this region, especially when accompanied by a heavy fall of snow. In the winter of 1887–'88 about 2 feet of snow fell, followed by three very severe nights in which the thermometer reached 28° below zero. This killed most of these birds. In the following fall I heard of but three or four coveys of Quail within a radius of 60 miles where thousands had been the year before. They ranged from the north end of Warner Valley south to Reno, Nevada, and were especially numerous in Buffalo Cañon and along the west shore of Pyramid Lake. They were very common up to the summits of the Warner Mountains, which attain here an altitude of about 6,000 feet, though the cañons and water courses found along those slopes were their favorite resorts. I have never seen or heard of

[1] Birds of the Northwest, 1874, p. 440.

a covey of these Quail down in the cultivated fields of the valleys. Here, at least, they prefer to live exclusively on the brush-covered hillsides."

That the Valley Partridge differs very much in its general habits in certain localities has long been known to me, still I did not for an instant suppose that I would meet with this species in a place like Fort Klamath, Oregon. Anyone at all acquainted with these birds would certainly not look for them in this locality, and I was greatly surprised to find a covey here in November, 1882. The post, situated in the upper Klamath Valley, is nearly surrounded by large pine forests. In winter the snowfall is generally quite heavy and the summer climate is variable, usually cool and damp, frost occurring sometimes every month in the year. To make sure of their identity I shot two of these birds, and found them plump and in excellent condition. The remainder, about a dozen in number, seemed to stand the winter well, the thermometer falling more than once considerably below zero, and in the summer of 1883 I noticed two coveys of half-grown birds. They were excessively shy at all times, living, as a rule, in the more open pine timber, and when disturbed flying at once into the densest growth of young pines and hiding in the trees. I never saw them on the open meadow or valley lands. I am certain that they were not introduced here, and as they are often known to travel long distances on foot, I believe they followed up the wagon road to the post, and this ending at that point, they settled down permanently, the mountains by which the fort is hemmed in barring a further advance. On the lower Klamath River they are common enough, but the character of the country is quite different there, and eminently suited to these birds, which can not be said of the locality where the post is situated.

The Valley Partridges found along the coast in southern California are intermediate between the two races, while the birds found in Lower California are typical *Callipepla californica vallicola.*

Mr. A. W. Anthony writes me about the Lower California birds as follows: "I found the Valley Partridge very common in the mountains of Lower California, up to an altitude of about 9,000 feet. Both in southern and Lower California I was told by the Indians and native Mexicans that during very dry seasons the Valley Quail did not nest, but remained in large flocks during the entire summer. This statement I was able to verify by personal observations during the summer of 1887. These birds were seen by me in large flocks throughout the spring and summer months, and only two or three broods of young were noticed. Birds taken during April, May, and June showed but little development of the ovaries. Should the winter rains, however, be sufficient to insure an abundance of seeds and grasses, the coveys begin to break up early in March, and from every hill in the land the loud challenge of the male is heard. The call notes of this subspecies are quite varied, frequently the same bird changing his call six or seven times within half an hour.

"A call heard frequently during the nesting season, and which seems to be a challenge from the male, is a clear, loud 'thee-hooo,' or 'quch-ōōō' (stress

being laid on the last syllable). This is usually uttered when the bird is perched on the topmost lobe of a cactus or other commanding point, and is repeated at intervals of two or three minutes for hours. The call from the male to his mate is a soft-tuned 'ah-wah' or 'ah-hooh,' tender and clear, and is heard during the entire nesting season. The alarm note of both sexes is a low 'quit-quit-quit,' usually uttered as the birds cluster under the shelter of a bush before they begin to scatter and run; and it seems to be rather more of a discussion as to the extent of the danger and the best method of avoiding it than the note which is heard a moment later when they have decided that the case is serious and requires a prompt retreat. Then a sharp 'chip-chip,' or 'pip, pip-pip' is uttered by each bird as it dashes forward a few feet before taking wing or till hidden in the nearest manzanita thicket. By far the most common call at all seasons is one resembling 'ca-ra-ho,' repeated four or five times, and the accent shifted from one syllable to another as suits the fancy of the performer. This note is often heard when the covey has been suddenly surprised, and sounds very much like an angry remonstrance against the intrusion. Sometimes when the covey is scattered, or the old bird is calling her brood together, a call something like 'ca-raw' is used."

Mr. William Proud, who is quite familiar with the habits of the Valley Partridge, writes me from Butte County, California, regarding them as follows: "Hundreds of these birds roost every night in the shrubbery around my house. Some of them are very tame, feeding among the chickens and coming on the veranda. They appear to know that they are protected. They mostly roost in thick brush, and on the ground when the brush is not at hand. In early seasons they begin to pair in the last week of February, but the time varies somewhat according to the season. During this period there is considerable fighting among the males for the favor of the coveted female. This is kept up until they are suitably mated and the nesting season arrives. This usually begins here about the last week in March, when the pairs scatter among the shrubbery along the banks of creeks and in adjacent ravines, along hedge rows and brush fences and on the borders of cultivated fields. The earliest nest I ever found was on March 15, and on April 15 I met young birds probably a couple of days old. I consider fourteen eggs to be about the average number laid by these birds, and have found as many as twenty-four in a nest. The large sets I attribute to other hens laying in the nest, probably young birds which have failed to make preparation for their own eggs. On May 21 my dog pointed a Valley Partridge on her nest which contained twenty-two eggs, and every one hatched.

"During incubation the male is very attentive and watchful, usually taking an elevated position near the nest, where with crest erect and tail spread he bids defiance to all intruders, uttering an oft-repeated 'whew-whew-whew.' When the brooding hen leaves the nest to feed, should he be absent from the post of duty, her cry of 'tobacco, tobacco,' very plainly given, brings him up at once. In fact, their call notes are very varied. I frequently heard an old cock call out at night 'ah-hooh, ah-hooh,' the first note in a low key.

"As soon as the young are hatched, they immediately leave the nest, keeping under cover as much as possible. Should the brood be disturbed, the old birds will run and flutter along the ground to draw the attention of the dog, or whatever may have frightened them, to themselves and away from the young. In about ten days these can fly a short distance. The Valley Partridge feeds on insects and the young and tender leaves of clover and green pease, later, on grain and various small seeds; in the fall they eat wild grapes and are also very partial to the seeds of the amaranth, also those of *Mentzelia lævicaulis*. Here only one brood is raised in a season, and incubation, as nearly as I can ascertain, lasts about twenty-eight days."

The nests and eggs of the Valley Partridge are similar in every respect to those of the California Partridge, and the number of eggs usually laid is about the same. In southern California they often nest under small juniper bushes and in prickly-pear or cactus patches. Usually but one brood is raised, but under favorable circumstances two are not uncommon. Mr. Anthony's statement that the Valley Partridge does not nest in exceptionally dry seasons in portions of its range has been fully verified by me through other observers, and appears to be a well-established fact.

None of the eggs of this Partridge are figured, as they are indistinguishable from those of the preceding. A number of the eggs from Cape St. Lucas of this subspecies average a trifle smaller than California and Oregon specimens, reducing the average measurement somewhat.

Seventy-six specimens in the U. S. National Museum collection average 31 by 24 millimetres. The largest egg of the series measuring 34 by 25, the smallest 28 by 23 millimetres.

## 13. Callipepla gambeli (Nuttall).

GAMBEL'S PARTRIDGE.

*Lophortyx gambeli* "Nuttall" Gambel, Proceedings Academy Natural Sciences, Phila., 1843, 260.

*Callipepla gambeli* Gould, Monograph Odontophorinæ, 1850, Pl. xvii.

(B 475, C 392, R 483, C 576, U 295.)

Geographical range. Northwestern Mexico and contiguous portions of United States from western Texas to southern California, north to southern Nevada and southern Utah.

The home of this graceful and interesting species includes that portion of southern California commonly known as the "Great American Desert." Here Gambel's Partridge reaches the most western point of its range, near San Gorgonio Pass, in San Bernardino County, California, where it overlaps that of the Valley Partridge and hybrids are found;[1] thence it ranges eastward through Arizona and the greater part of New Mexico into western Texas. To the north

[1] Auk, Vol. II, 1885, p. 247.

it is found in southwestern Utah and the Death Valley region of southern Nevada, as well as in parts of northern New Mexico, where Dr. C. J. Newberry, jr., met with it a few miles south of Santa Fé. South it extends into western Mexico. It is a resident, and breeds wherever found.[1]

In southern Arizona, along the valley of the Gila River, it used to be exceedingly abundant before the day of railroads, and is yet, I presume. In those days Gambel's Partridge was one of the most pleasing sights to the weary traveler over Arizona's hot and dusty plains, where springs and even stagnant water holes were few and far between, and stretches of 50 miles without water were not unusual. The presence of these handsome little game birds always indicated that this much-needed fluid, poor as it often might be, was not far off, and this cheered you, for which reason alone, if for no other, their appearance was doubly welcome. Numerous wells along the principal highways and railroads have changed all this now, and a journey through Arizona to-day has lost about all its terrors, and can be made in comparative comfort and even luxury.

For one of the most exquisite pieces of word painting of Arizona, as it appeared thirty years ago, and at the same time giving an exceedingly interesting and accurate account of the life-history of Gambel's Partridge, I refer the reader to an article in the Ibis of January, 1866, entitled "Field Notes on *Lophortyx gambeli*, by Elliott Coues, M. D.," which will not fail to prove attractive to the most critical observer. Concerning the relative abundance of Gambel's Partridge in Arizona at present, Mr. Herbert Brown, of Tucson, writes me as follows: "There is no diminution in their numbers; if anything, they have multiplied in proportion to the extent of increased cultivation. I have been told that some farmers on the Salt and Gila Rivers, about Florence and Phœnix, poisoned them as a nuisance, and in a 'game bill,' introduced in the Arizona legislature in 1885, Partridges had to be stricken out from protection before the bill could pass."

Wherever water is found Gambel's Partridge is common throughout southern Arizona up to an altitude of 5,000 feet; and in New Mexico, Mr. W. H. Cobb, of Albuquerque, informs me of meeting with young fledglings in the pine forests at an altitude of 8,000 to 9,000 feet. In 1872 I found this species very abundant near my camp on Rillitto Creek, the present site of Fort Lowell, 7 miles northeast of Tucson. During the winter and early spring coveys of these birds might be seen almost daily, feeding and dusting themselves in the immediate vicinity of my camp, and especially on the wagon roads leading to it. They frequented these mostly in the mornings and occasionally in the evenings, the birds scratching about in the sand and dusting themselves like domestic fowls. They appeared very sociable, and were constantly calling to each other as the scattered covey moved from

[1] Lieut. Robert C. Van Vliet, U. S. Army, tells me that he tried to introduce this species in the vicinity of Fort Union, New Mexico, liberating fifty of these birds in February, 1884. They all disappeared within a year. The birds met with by Dr. Newberry, near Santa Fé, may have been stragglers or descendants of this lot.

place to place. This note resembled the grunting of a sucking pig more than anything else, and it is rather difficult to reproduce the exact sound in print. Any of the following syllables resembles it, "quoit," "oit," "woét," uttered rapidly but in a low tone. During the mating and breeding season, the former commencing usually in the latter part of February, the latter about the first week in April and occasionally later, according to the season, the male frequently utters a call like "yuk-käe-ja, yuk-käe-ja," each syllable distinctly articulated and the last two somewhat drawn out. A trim, handsome, and proud-looking cock, whose more somber-colored mate had a nest close by, used an old mesquite stump, about 4 feet high, and not more than 20 feet from my tent, as his favorite perch, and I had many excellent opportunities to watch him closely. Standing perfectly erect, with his beak straight up in the air, his tail slightly spread and wings somewhat drooping, he uttered this call in a clear strong voice every few minutes for half an hour or so, or until disturbed by something, and this he repeated several times a day. I consider it a call of challenge or of exultation, and it was taken up usually by any other male in the vicinity at the time. During the mating season the males fight each other persistently, and the victor defends his chosen home against intrusion with much valor. It is a pleasing and interesting sight to watch the male courting his mate, uttering at the time some low cooing notes, and strutting around the coy female in the most stately manner possible, bowing his head and making his obeisance to her. While a handsome bird at all times, he certainly looks his best during this love-making period. The alarm note is a sharp discordant "crähr, crähr," several times rapidly repeated, and is usually uttered by the entire covey almost simultaneously. Although they nested abundantly in close proximity to my camp, I saw but a single brood of birds that were probably not more than a day or two old. Small as these were, they nevertheless managed to run and hide so quickly in the undergrowth in which I found them that I failed to catch one for closer examination. The hen tried to draw me away by the usual devices, and showed considerable anxiety. Half-grown birds were much more frequently met with by me, and not until they are well able to fly do they make excursions in the more open country, away from the tangled undergrowth and vine-covered chaparral of the creek bottoms. Their food, like that of the other species of this genus, consists of insects of various kinds, especially grasshoppers and ants, small seeds, grain when obtainable, the tender leaves and buds of leguminous plants, and berries. In the early fall and winter they pack, and from two to five hundred may, at times, be met with on favorite feeding grounds.

During the intense heat of the Arizona summers Gambel's Quail, like most other birds, prefers to remain in the shady and cool spots in the creek bottoms, frequently perching in the trees, and I believe the majority of these birds spend the nights in them as well. They take to trees very readily at all times. The nesting season of 1872, compared with subsequent ones, was

an unusually late one, and though I searched carefully for the nests of this species during both April and May, I failed to find a single one before May 29. This contained ten fresh eggs. During June I found a number, however, also two in July, and one as late as August 17. I believe two broods are regularly raised in a season. Incubation, as near as I was able to learn, lasts from twenty-one to twenty-four days, and does not begin until all the eggs are laid, and these are deposited daily.

The nest of Gambel's Partridge is simply a slight oval-shaped hollow, scratched out in the sandy soil of the bottom lands, usually alongside of a bunch of "sacaton," a species of tall rye grass, the dry stems and blades of last year's growth hanging down on all sides of the new growth and hiding the nest well from view. Others are placed under, or in a pile of, brush or drift brought down from the mountains by freshets and lodged against some old stump, the roots of trees, or other obstructions on some of the numerous islands in the now dry creek beds, refreshing green spots amid a dreary waste of sand. (It is perhaps as well to mention that many of the so-called creeks in Arizona are dry for about ten months of the year, the water sinking below the sand for a foot or or two, but running below this through the coarser gravel, digging being necessary in order to reach it.) These so-called islands are always covered with a luxurious vegetation, and it is in this that most of the Partridges nest. According to my observations only a comparatively small number resort to the cactus and yucca covered foothills and mesas some distance back, where the nests are usually placed under the spreading leaves of one of the latter-named plants. If grain fields are near by they nest sometimes amidst the growing grain in these, and should the latter be surrounded by brush fences, these also furnish favorite nesting sites.

Among the nests observed by me two were placed in situations above ground. One of these was found June 2 on top of a good-sized rotten willow stump, about 2½ feet from the ground, in a slight decayed depression in its center, which had, perhaps, been enlarged by the bird. The eggs were laid on a few dry cottonwood leaves, and were partly covered by these. Another pair appropriated an old Road-runner's nest, *Geococcyx californianus*, in a mesquite tree, about 5 feet from the ground, to which apparently a little additional lining had been added by the bird. The nest contained ten fresh eggs when found on June 27, 1872.

Mr. Herbert Brown found a pair of these birds occupying a newly-made nest of a Palmer's Thrasher, *Harporhynchus curvirostris palmeri*, in which seven eggs had been deposited. This nest was placed in and near the top of a cholla cactus about 4 feet from the ground. He says: "My first impression was that an Indian had probably placed them there, but I was soon convinced to the contrary, as I found it impossible to get my head near the nest without first breaking down a part of the cholla with the barrels of my gun. The eggs were fresh and finely marked."[1]

[1] Forest and Stream, June 4, 1885.

Birds resorting to nesting sites in trees or cacti have undoubtedly lost their eggs or small young on former occasions, and learned from experience that such a situation is in many respects a safer one.

During the nesting season of 1872, I found, upon a second visit, that several incomplete sets of eggs belonging to this species had been destroyed or removed. The numerous large snakes of various kinds, especially the rattlesnake, must be counted among the worst of their enemies.

On one occasion I found a Gambel's Partridge's nest in the side of a sandbank. A portion of this had been washed away by a former freshet and a sod of grass having been undermined thereby fell over it, being still firmly held in place by its roots. The bird had scratched out a hole in the sandy bank behind this sod and deposited her eggs therein, and it appeared to me to be an extremely well-selected nesting site. It proved otherwise, however, for a few days later, when passing by the spot again, I put my hand in the cavity, the contents of which were not visible without raising the sod, I came in contact with something cold which I at first supposed to be a snake; and being curious to see what it really was and not able to dislodge it, I raised the sod with a stick and found a land terrapin taking its ease in the nest. Not the sign of an egg remained, neither were any broken shells visible. Whether the reptile had eaten the eggs or not I was unable to decide, as I found no remains of them in the stomach. That reptiles of various kinds are not adverse to an egg diet is shown by the following instance kindly furnished by Mr. Herbert Brown. A Gila monster, *Heloderma suspectum*, had been caught alive near Tucson, Arizona, on April 14, 1890, and was placed in a packing box for safekeeping over night. Next morning five eggs were found in the box with the occupant. Two of these were forwarded to me for identification by Mr. Brown, who wished to know if they were the eggs of this reptile or of Gambel's Partridge, he surmising the latter. There was no difficulty in solving this problem, for the shells of the eggs, although considerably injured, plainly showed the peculiar markings of the egg of Gambel's Partridge, and even the shape, leaving no possible doubt that they were the product of one of these birds and not of the Gila monster, which had probably swallowed them whole on the day it was caught and thrown them up during the night.

The nests of Gambel's Partridge are lined usually, but very slightly, with bits of dry grasses or leaves, and often contain no lining whatever, the eggs lying on the dry, sandy soil. These usually number from ten to twelve in a set, but occasionally double these numbers are found, which are unquestionably the product of more than one hen. I have several times found ordinary-sized sets placed in two layers, one egg on top of the other, the cavity being in such cases deep, narrow and not rounded.

A set found by me June 20, 1872, contained nineteen fresh eggs, evidently laid by two different birds, as the eggs showed two radically different

and distinct types of markings. These were likewise placed in two layers. In the hot Gila River Valley in southern Arizona, nidification commences in some seasons by the middle of March.

Mr. John Swinburne informs me of finding a full set of eggs on March 19, near Phœnix, in Maricopa County. In the vicinity of Tucson they lay somewhat later. The earliest date at which eggs of this species have been found there, according to the observations of Mr. Brown, is April 4, usually about the latter part of this month and the beginning of May, the nesting season continuing into August and sometimes even to September.

The eggs of Gambel's Partridge are short ovate in form, and the ground color varies from a dull white to a creamy white and pale buff color. The eggs are spotted, clouded, and blotched, sometimes very heavily, with irregular markings or blotches, and again with well-defined and rounded spots of dark seal-brown and écru drab. Diffused over these blotches is found a peculiar purplish or pinkish bloom, difficult to describe, resembling somewhat the rich bloom found on blue grapes and various kinds of plums when first picked. These markings, when touched by water or moisture of any kind, change radically, becoming seal brown, or chestnut brown of different shades, according to the variable amount of pigment on the shell of the egg. Carefully blown specimens will retain this peculiar bloom for years, and some eggs collected by me and now deposited in the U. S. National Museum, one of which is figured, show this as plainly to-day as when they were first taken, fully eighteen years ago. Eggs of *Callipepla gambeli* are, as a rule, more heavily spotted than those of the two California Partridges, and the color of the markings in the majority of specimens is decidedly different. The peculiar golden russet shade so often present in the eggs of the latter is almost entirely wanting here, and is replaced by darker and more bluish brown tints.

The average measurement of ninety-seven specimens in the U. S. National Museum collection is 31.5 by 24 millimetres, the largest egg of the series measuring 34 by 26, the smallest 28.5 by 24 millimetres. The type specimens, No. 16480 (Pl. 1, Fig. 11), selected from a set of ten eggs, taken June 14, 1872, and No. 21116, two eggs selected from a set of nineteen (Pl. 1, Figs. 13 and 14), one showing the peculiar bloom before mentioned, and the other a decided difference in the style of markings, taken June 20, 1872, near Rillitto Creek, Arizona (Bendire collection), were found by the writer. No. 23938 (Pl. 1, Fig. 12), from a set of ten eggs, was taken by Mr. Herbert Brown at the Laguna, near Tucson, Arizona, May 19, 1889.

## 14. Cyrtonyx montezumæ (Vigors).

MASSENA PARTRIDGE.

*Ortyx montezumæ* Vigors, Zoölogical Journal, v, 1830, 275.
*Cyrtonyx montezumæ* Stejneger, Auk, II, January, 1885, 46.
(B 477, C 394, R 485, C 578, U 296.)

Geographical range: Western and central Mexico, from Mazatlan and valley of Mexico, north to western Texas, New Mexico, and Arizona.

This handsome and peculiarly marked Partridge, better known in western Texas as the "Black" or "Black-bellied" Quail, and in Arizona as the "Fool" Quail, inhabits the rough mountainous regions of the last-mentioned Territory north to at least the vicinity of Fort Whipple, which, as far as known at present, marks the western limit of its range, and where it was first obtained by the well-known ornithologist, Dr. Elliott Coues. Thence it extends eastward through New Mexico, north to about latitude 36°, where Capt. William L. Carpenter, Ninth Infantry, U. S. Army, observed it in the upper Rio Grande Valley, near Taos. It is also found in suitable localities in the intervening country, in a southeasterly direction, throughout portions of western and southwestern Texas. Mr. Dresser's specimen, obtained in the Bandera Hills, about 40 miles northwest of San Antonio, marks about the most easterly known point of its range. According to Mr. William Lloyd, it ranges south from the Llano Estacado and mountainous regions of western Texas to the Sierra Madre Mountains in Sonora, Chihuahua, and Sinaloa, and the mountains in Jalisco in northwestern Mexico, inhabiting regions from an altitude of 4,000 to 9,000 feet. In the less elevated parts of its range it is a constant resident and breeds, but at the higher altitudes it is only a summer visitor, retiring to the lower foothills on the approach of winter.

Although sixty years have passed since the Massena Partridge was first described by Vigors, nothing absolutely reliable was known about the nest and eggs of this bird up to the season of 1890. Not a single positively identified egg was to be found in any of the larger and well-known oölogical collections of the country, and up to the time of this writing no description of them has been published. This is rather remarkable when the extensive range which this species occupies within our borders is considered, and also the fact that in many localities it is by no means rare. Nevertheless the Massena Partridge, next to the Lesser Prairie Hen, *Tympanuchus pallidicinctus*, is still one of the least-known game birds of the United States.

Mr. William Lloyd writes me from Marfa, Texas, that "the favorite resorts of the Massena Partridge are the rocky ravines or arroyas that head well up in the mountains. They quickly, however, adapt themselves to changed conditions of life and are now to be seen around the ranches picking up grain and scratching in the fields. In the vicinity of Fort Davis,

Texas, they have been exceptionally numerous and may frequently be seen sitting on the stone walls surrounding grainfields in Limpia Cañon. In Mexico I have seen them several times living contentedly in cages. In Mesquite Cañon they are the only Partridge found, and in June and July, 1887, I spent some time there trying principally to locate the nest and eggs of this species. I found a single egg in a depression at the roots of a tasaca cactus, presumably belonging to this species. It was white, without any markings whatever. While there I was informed by two different parties living in the vicinity that each of them had found a nest the previous year, 1886, containing eight and ten eggs respectively, which they had eaten. They described the eggs as being white in color. Both said that the nest was simply a slight hollow, one under a small shin-oak bush, the other alongside a sotol plant. The call note of this bird is a low murmuring whine, more like that of the rock-squirrel, *S. grammurus*, than a bird, and it can be heard quite a distance. I can not imitate it in syllables. They are very fond of acorns, mountain laurel, arbutus, cedar, and other berries, and range in coveys from eight to twelve."

Capt. Platt M. Thorne, Twenty-second Infantry, U. S. Army, writes me: "I found the Massena Partridge common at both Forts McKavett and Clark, Texas, where they apparently liked the same kind of ground as the Texan Bob White, yet the lines of their habitat seem mysteriously restricted for some reason. Can it be that their food is peculiar? All the stomachs I have examined (fall birds) contained little else than large quantities of white shiny bulbous roots, rounded at both ends, and about the size of French pease. I regret now that I never forwarded any of these roots, that it might be determined what they were. You are aware how well these birds are adapted to scratching and I have an idea that this root food might account for their restricted distribution. I also found them abundant on a divide near Nueces River, but I never saw any within 20 miles of the Rio Grande."

Lieut. Robert C. Van Vliet, Tenth Infantry, U. S. Army, also met with the Massena Partridge in western Texas and northern New Mexico (Fort Union), usually along the sides of rocky ravines. He tells me that they were fairly common, and that their food (at least during the fall and early winter), consisted almost entirely of a small angular brownish-looking bulb, with a white kernel, the root of a short grass, their crops containing scarcely anything else excepting small particles of gravel. He often saw where they had scratched out holes to the depth of 2 inches in search of these roots, and such evidences were always abundant in localities frequented by these birds. Their call note is a clear "dsiup-chiur." He rarely saw coveys consisting of more than eight birds. Polecats seem to be one of their principal enemies.

Capt. William L. Carpenter, U. S. Army, states: "I have observed this species in the Rio Grande Valley, near Taos, New Mexico, and more frequently on the headwaters of the Black and White Rivers, where it undoubt-

edly breeds, and I have often looked for their nests unsuccessfully. In the spring and summer they are usually found in pairs; the balance of the year they range all through the White Mountain region of Arizona above an altitude of 4,000 feet, in coveys, but these are never numerous, and usually small in size. They are probably more subject to the attacks of predatory animals than any other species, owing to their confiding disposition, which has given them the name of 'Fool' Quail. I once stopped my horse, when about to step on one, and watched it for some time without creating alarm. After admiring it for several moments, squatting close to the ground within a yard of the horse, and watching me intently, but apparently without fear, I dismounted, and almost caught it with my hat, from under which it fluttered away. The flight, which is remarkably rapid, is accompanied by a peculiar clucking."

According to Mr. John Swinburne, of St. John's, Apache County, Arizona, the favorite localities frequented by this species during the breeding season are thick live-oak scrub and patches of rank grass, at an altitude of from 7,000 to 9,000 feet. He says: "Here they are summer residents only, descending to much lower altitudes in winter. They lie very close at all times, allowing one to almost step on them before they move. I have seen this species on the White Mountains during the breeding season, and saw young birds of the year shot there. Even the adults seem very stupid when suddenly flushed, and after flying a short distance, alight and attempt to hide in most conspicuous places. I have seen men follow and kill them by throwing stones."

Mr. E. W. Nelson writes me as follows: "In September, 1882, I found this bird rather common near Chloride, and Fairview, New Mexico. Old birds with half-grown young were found late in the afternoon each day in the roads leading down the bottoms of open brush-bordered cañons that extend down the flanks and foothills of the Black Range in this vicinity. A small stream was usually found in these, which disappeared in the sand a mile or two below on reaching the open barren country.

"The Massena Partridges were commonly found dusting themselves in the roads, and usually stood and watched our approach until we were within a few yards, and then flew into the bordering thicket and laid very close. When a covey was surprised among the grass they arose at our feet and scattered in every direction, but never went very far, and while flying off they would utter low notes of alarm, sounding like 'chuk-chuk-chuk.' I also found them not uncommon in the Santa Rita Mountains of southern Arizona in July, 1884. Here they occupied the live-oak belt below the lower limit of the pines. On the northeastern slopes of the White Mountains, near Springerville, Arizona, a pair has raised a brood during several successive seasons at the lower edge of the pine forest, at an altitude of about 7,500 feet. After the young are hatched they are often led up among the pines to an altitude of between 8,000 and 9,000 feet, where I have seen them.

"The birds breeding along the northern limit of their habitat migrate southward in October. In southern Arizona the same result of a warmer winter climate is obtained by descending the flanks of the mountains. The summer range of this species is just above and bordering that of Gambel's Quail in parts of Arizona and New Mexico. The fact that Gambel's Quail changes its range but little in winter results in these birds being found very frequently occupying the same ground at this season. I have never seen the Massena Partridge in coveys larger than would be attributed to a pair of adults with a small brood of young. Frequently a pair raise but three or four, and I do not remember having ever seen more than six or seven of these birds in a covey."

Personally I met with this species several times in the foothills and cañons of the Santa Rita, Patagonia, and Huachuca Mountains in southern Arizona in the early part of August, 1872, while scouting after hostile Indians, but had no time then to study their habits nor to look for their nests. A small covey of young, less than half grown, were seen by me on August 14 in a cañon of the Patagonia Mountains, about 12 miles from Camp Crittenden, and an addled egg was picked up from an abandoned nest under a small yucca in the same vicinity by one of my packers, whose attention was drawn to the place by seeing several broken egg shells lying about the yucca, and dismounting to investigate he found the egg under the bush and concealed by it, which he handed to me some two hours afterwards. The nest, he said, was within 5 feet of the trail I had previously passed over. While not absolutely certain of the identity of this egg I always felt confident that it belonged to this species, and since I have had an opportunity of examining the eggs taken during the season of 1890 I have no further doubt of it. The egg in question is ovate in shape, differing in this respect from all the eggs of the genus *Colinus* I have ever seen, which are usually rounded ovate, or subpyriform. The egg is pure white in color, the shell is smooth and close grained, and it measures 32 by 23 millimetres.

Mr. Otho C. Poling writes me that he found the Massena Partridge in parts of the Whetstone, the Santa Rita, Patagonia, and Huachuca Mountains of southern Arizona, where they were fairly common. He says: "During most of the year the Massenas remain in coveys of from four to a dozen birds in number, and even at the height of the nesting season I have several times found coveys of half a dozen together, while I have shot pairs in the month of February.

"On June 12, 1890, I shot a female and found a fully developed egg in her oviduct which would have been laid soon. It measures 30.5 by 25 millimetres, and is pure white in color. In another female, shot the same day, the ovary contained small ova about the size of No. 6 shot, which would not have been laid for some weeks. On July 15 I found my first productive nest. I was climbing up a steep mountain side on the northeast of the Huachuca Mountains, some 10 miles north of the border, when at an

elevation of about 8,000 feet I flushed the female almost directly under my feet and shot it. The hillside was covered in places with patches of pines and aspens, as well as with low bushes and grasses. The nest was directly under a dead limb which was grown over with dead grass, and so completely hidden that until I had removed the limb and some of the grass it was not discernible at all. The nest was sunken in the ground, and composed of small grass stems, arched over, and the bird could only enter it by a long tunnel leading to it from under the limb and the grass growing around it. The eggs were eight in number and naturally white, but they were badly stained by the damp ground, their color being now a brownish white. They were almost hatched. The female must have remained on them all the time to have caused such uniform incubation and preserved the eggs from spoiling by the excessive dampness.

"On July 27 I met with a female and brood of about a dozen young. The entire family was in view when I at first saw them crossing an old trail. They at once entered some dense bushes, and I failed to capture or even see any of them again. The young were probably about a week old. On August 31 I discovered another brood, about a dozen in number, which were but a few days out of the nest. I secured one of the young which must have been hatched late in the month."

Mr. G. W. Todd writes me as follows: "I first met with the Massena Partridge in Bandera County, Texas, in 1883, where they very scarce, and I learned but little of its habits for a long time. They are very simple and unsuspicious, and apparently live so much in such barren and waste places that they do not see enough of man to make them afraid. On seeing a person they generally squat at once, or run a little way and hide. They will hardly fly until one is almost on them, but when they finally do fly they go much further than either the Texan Bob White or the Scaled Partridge, and on alighting they run rapidly for a little distance and then squat again, generally flushing easier the second time. It is rare to see more than six together; two or three are more often met with. In the fall of 1886 I found a covey of five on a wet and misty day, and killed three of them with a Winchester rifle before the remaining two flew. I never found their nest nor met with small young until this year. I saw but a single young bird this season, and this seemed to be entirely alone. They are not very abundant here, and are always found in the most barren places, among rocks and wastes, where even the prickly pear is stunted, and no bush grows over 3 feet high. When scared they utter a kind of whistling sound, a curious combination between a chuckle and a whistle, and while flying they make a noise a good deal like a Prairie Hen, though softer and less loud, like 'chuc-chuc-chuc' rapidly repeated.

"The only nest of this species I have ever seen was situated under the edge of a big bunch of a coarse specie of grass, known as 'hickory grass.' This grass grows out from the center and hangs over on all sides until the blades touch the ground. It is a round, hard-stemmed grass, and only grows on the

most sterile soil. According to my observations the Massena Partridge is seldom seen in other localities than where this grass grows. I was riding at a walk up the slope of a barren hill when my horse almost stepped on a nest, touching just the rim of it. The bird gave a startled flutter, alighting again within 3 feet of the nest and not over 6 feet from me; thence she walked away with her crest slightly erected, uttering a low chuckling whistle until lost to view behind a Spanish bayonet plant (yucca), about 30 feet off. I was riding a rather unruly horse, and had to return about 30 yards to tie him to a yucca, before I could examine the nest. This was placed in a slight depression, possibly dug out by some animal, the top of the nest being on a level with the earth around it. It was well lined with fine stalks of wire-grass almost exclusively, the cavity being about 5 inches in diameter and 2 inches deep. At the back, next to the grass, it was slightly arched over, and the overhanging blades of grass hid it entirely from sight. The nest was more carefully made than the average Bob White's nest, and very nicely concealed."

The eggs, ten in number, were fresh when found, pure white in color, rather glossy, and the majority of them are more elongated than those of the Bob White. A few of these eggs resemble those of the latter somewhat in shape, but the greater number are distinctly ovate and much more glossy. Some are slightly granulated, and corrugations converge from near the middle to the small end.

This set of eggs of the Massena Partridge is now in Mr. Thomas H. Jackson's collection, at West Chester, Pennsylvania, who has kindly allowed me to examine them and figure one. They were taken by Mr. G. W. Todd, near the head of Turkey Creek, in Kinney County, Texas, June 22, 1890, and are, as far as I am aware, the first fully identified eggs of this species that have been found.

Mr. Todd has kindly sent me a couple of skins and stomachs of these birds. The latter, according to the report of Dr. C. Hart Merriam, in charge of the Division of Ornithology, U. S. Department of Agriculture, contained principally cactus seeds (*Opuntia*), a few bits of cactus prickles, a lot of finely ground vegetable matter with a trace of insects, and a large amount of coarse sand, mainly iron ore.

The average measurement of the eight eggs found by Mr. Poling is 32 by 24 millimetres. The largest egg of Mr. Jackson's set measures 33 by 24.5 millimetres. This is figured on Pl. 1, Fig. 15, the smallest measuring 30 by 23.5 millimetres; they average 31.5 by 24 millimetres.

## 15. Dendragapus obscurus (Say).

DUSKY GROUSE.

*Tetrao obscurus* Say, Long's Expedition, II, 1823, 14.
*Dendragapus obscurus* Elliot, Proceedings Academy Natural Sciences, Philadelphia, 1864, 23.

(B 459, C 381, R 471, C 557, U 297.)

Geographical range: Southern Rocky Mountains, from central Arizona and New Mexico, north to southeastern Idaho and central Wyoming, east to southwestern South Dakota, west to northeastern Nevada.

With our present limited knowledge it is rather a difficult matter to define accurately the range of the Dusky Grouse from that of the two subspecies, the "Sooty" and "Richardson's" Grouse; this can only be done approximately as yet. The three forms are well known and rank as the finest of game birds, and next to the Sage Fowl are the largest Grouse found within the United States.

Beginning with the northern range of the Dusky Grouse as well as I can define it, this includes a small portion of southeastern Idaho, where it intergrades with *D. obscurus fuliginosus*, thence eastward through Wyoming and western South Dakota (Black Hills), south and west through northeastern Nevada (East Humboldt Mountains), Utah, central and western Colorado, as well as northern and central Arizona and nearly the whole of New Mexico, excepting the extreme southern portion south of the Rio Mimbres, which marks the most southern limit of its range.

It is more or less a common resident in suitable localities, *i. e.*, the outer borders of the timbered mountain regions of the States and Territories mentioned, and breeds wherever found. It is best known as the Blue Grouse, and is also called Pine Grouse and Pine Hen.

Mr. Denis Gale, of Boulder County, Colorado, a careful and reliable observer, writes me as follows: "Here in Colorado the Dusky Grouse ranges from an altitude of about 7,000 feet to timber line. Having once selected a place to raise a brood they do not stray far from the neighborhood. Water at no great distance is always kept in view. The lower gulches and side hills are mostly chosen for their summer homes. During the mating season if you are anywhere near the haunts of a pair you will surely hear the male and most likely see him. He may interview you on foot, strutting along before you, in short hurried tacks alternating from right to left, with widespread tail tipped forward, head drawn in and back and wings dragging along the ground, much in the style of a turkey gobbler. At other times you may hear his mimic thunder overhead again and again in his flight from tree to tree. As you walk along he leads, and this reconnoitering on his part, if you are not familiar with it, may cause you to suppose that the trees are alive with these Grouse. He then takes his stand upon a rock, stump, or log, and in the manner already described distends the lower part of his neck, opens his frill of white, edged with the darker feather tips, showing in its center a pink narrow line describing

somewhat the segment of a circle, then with very little apparent motion he performs his growling or groaning, I don't know which to call it, having the strange peculiarity of seeming quite distant when quite near, and near when distant; in fact, appearing to come from every direction but the true one. The first time I heard the sound I concluded it was the distant laboring of one of our small mountain sawmills wrestling in agony with some cross-grained sawlog. It appeared to me like it.

"As near as I can judge by meeting with the young broods, these birds nest at the lowest points about May 15, at the highest about the beginning of June. The number of chicks seen by me in a brood ranged from three to eight. The young in the downy stage are beautiful, delicate little objects. Upon one occasion I met with a covey which had just been hatched; they were quite nimble, and with the exception of one which I caught they hid themselves with great address. Until I released the little prisoner the female showed great distress, clucking in the most beseeching manner, accompanied with suitable gestures, similar to but more tender and graceful than those of our domestic hen. She stood within 6 or 7 feet of me pleading her cause and easily won it. In her beautiful summer dress of brown, handsomely plumed as she was, she looked very interesting.

"In a single instance only, with a brood about ten days old, have I noted the presence of both parents. Perched upon a fallen tree the male seemed to be on the lookout, while the female and young were feeding close by. This seeming indifference of the male while the brood is very young, allowing his mate to protect them, if he really is always near at hand, looks very strange, and yet it may be the case, since he is generally with the covey when the young are well grown. Directly the young are able to travel, the hen Grouse leads them to some desirable opening skirting the timber, or gulch where bearberries, wild raspberries, gooseberries, and currants, as well as grasshoppers, worms, and grubs are abundant, managing them just as the domestic hen does her brood. The young grow rapidly, and when about two weeks old can do a little with their wings; then instead of hiding on the ground they flush and endeavor to conceal themselves in the standing timber. Until almost fully grown they are very foolish; flushed, they will tree at once, in the silly belief that they are out of danger, and will quietly suffer themselves to be pelted with clubs and stones till they are struck down one after another. With a shotgun, of course the whole covey is bagged without much trouble, and as they are, in my opinion, the most delicious of all Grouse for the table, they are gathered up unsparingly."

Mr. John Swinburne informs me that in southeastern Arizona the Dusky Grouse frequents thick spruce and fir timber, and is generally found at an altitude of about 9,000 feet. He says: "If found on the ground they almost invariably fly into the nearest tree and sit there, moving their heads from side to side, gazing at the intruder first with one eye then with the other. I have shot at them repeatedly with the rifle and pistol before they

flew from the branch on which they had settled. Broods of young, on being disturbed, scatter and hide, the old bird flying into a neighboring tree. These broods usually number from eight to ten."

A nest found near Fort Garland, Colorado, is described by Mr. H. W. Henshaw as follows: "A nest found June 16 contained seven eggs on the point of hatching. The nesting site was a peculiar one, being in an open glade, where the grass had been recently burned off. The nest proper was a slight collection of dried grass placed in a depression between two tussocks, there apparently having been no attempt made at concealment."[1]

The Dusky Grouse raises but a single brood a season, and, as a rule, the nest is well concealed. A slight depression is scratched out by the bird, alongside an old log, under a small thick bush or a tall bunch of grass; this is slightly lined with pine needles, bits of dry grass, or whatever suitable material is most convenient to the site selected. The number of eggs to a set varies from seven to ten, rarely more, although they have generally been credited with larger numbers, up to fifteen. Such large sets are very exceptional, and eight or nine are the numbers most often found. An egg is deposited daily, and incubation does not commence till the set is completed. Nidification begins usually about the middle of May, and varies somewhat, both according to season and altitude. Incubation lasts, as nearly as I can determine, from eighteen to twenty-four days. The eggs resemble in shape, size, and markings those of the Sooty Grouse; and as the U. S. National Museum collection contains a much better series of this race, showing considerable variation both in the ground color and the markings, and as the same differences would unquestionably be found in an equal number of the eggs of the Dusky Grouse, I have had only a series of the former figured. The average size of the few specimens in the U. S. National Museum collection is 50.5 by 35 millimetres.

## 16. Dendragapus obscurus fuliginosus Ridgway.

SOOTY GROUSE.

*Canace obscura* var. *fuliginosa* Ridgway, Bulletin Essex Institute, v, December, 1873, 199.

*Dendragapus obscurus fuliginosus* Ridgway, Proceedings U. S. National Museum, VIII, 1885, 355.

(B —, C 381*b*, R 471*a*, C 559, U 297*a*.)

Geographical range: Northwest Coast Mountains, from California north to Alaska (Sitka), east to western Nevada, western Idaho, and middle British Columbia.

The Sooty Grouse, as fine a game bird as the preceding, is an inhabitant of the mountains of the Northwest. It has been taken as far north as Portage Bay, Alaska, near latitude 60°, and probably reaches farther in this direction

[1] Explorations and Surveys west of 100th meridian, Wheeler, 1875, p. 92.

wherever good-sized timber is found. South it ranges through British Columbia, Washington, Oregon, and the greater portion of California, to about latitude 35° (vicinity of Fort Tejon in the southern Sierra Nevada). East it is found to the western slopes of the Bitter Root Mountains in Idaho, intergrading in the northern and central portions of this State with *Dendragapus obscurus richardsoni*. It also occurs in western Nevada, and is fairly abundant in suitable localities throughout its range, at altitudes varying from 2,500 to 9,000 feet. It is a constant resident and breeds wherever found. All the Sooty Grouse from Alaska, and I presume from the Northwest coast generally, are much darker, almost a sooty black, than specimens from eastern Washington and Oregon, which resemble the Dusky Grouse much more in their general coloration than the northern bird.

Personally I have met with the Sooty Grouse in various sections of the Pacific coast, such as Mount Kearsarge in Inyo County, near the headwaters of the King and Kern Rivers, California, and in numerous localities in Oregon, Washington, and Idaho.

The following account of this species is taken from an article of mine published in the Auk (Vol. VI), January, 1889:

"I first met with the Sooty Grouse on Craig's Mountain, near Fort Lapwai, Idaho, on the Nez Percé Indian Reservation, and was told by both trappers and Indians that these birds did not remain there during the winter, in which belief I consequently shared at that time. I was also told that when a covey had been located in a tree, by being careful always to shoot the bird sitting lowest, the whole lot might be successfully secured. This may be so, but somehow it always failed with me; usually after the second shot, often even after the first, and certainly at the third, the remaining birds took wing, and generally flew quite a distance before alighting again, nearly always placing a deep cañon between themselves and me.

"At Fort Lapwai, in the early fall of 1870 and of 1871, on two or three occasions I found a few of these birds feeding with large packs of the Sharp-tailed Grouse. This must, however, be considered an unusual behavior, as I never noticed it anywhere else subsequently, although both species were equally abundant in other localities where I met them frequently in after years. The favorite locations to look for the Sooty Grouse during the spring and summer are the sunny, upper parts of the foothills, bordering on the heavier timbered portions of the mountains, among the scattered pines and the various berry-bearing bushes found in such situations, and along the sides of cañons. According to my observations these birds are scarcely ever found any distance within the really heavy timber. In the middle of the day they can usually be looked for with success amongst the deciduous trees and shrubbery found along the mountain streams in cañons, especially if there is an occasional pine or fir tree mixed amongst the former. The cocks separate from the hens after incubation has commenced, I believe, and keep in little companies, of from four to six, by themselves, joining the

young broods again in the early fall. At any rate, I have more than once come upon several cocks in June and July without seeing a single hen amongst them. High rocky points near the edges of the main timber, amongst juniper and mountain mahogany thickets, are their favorite abiding places at that time of the year. The young chicks are kept by the hen for the first week or two in close proximity to the place where they were hatched, and not until they have attained two weeks' growth will they be found along the willows and thickets bordering the mountain streams. Their food consists at first principally of grasshoppers, insects, and tender plant tops, and later in the season of various species of berries found then in abundance everywhere, as well as the seeds of a species of wild sunflower, of which they seem to be very fond. It is astonishing how soon the young chicks learn to fly, and well, too, and how quickly they can hide and scatter at the first alarm note of the mother bird, which invariably tries by various devices to draw the attention of the intruder to herself and away from her young. A comparatively small leaf, a bunch of grass, anything in fact will answer their purpose; you will scarcely be able to notice them before they are all securely hidden, and unless you should have a well-trained dog to assist you, the chances are that you will fail to find a single one, even when the immediate surroundings are comparatively open. After the young broods are about half grown, they spend the greater portion of the day, and I believe the night as well, among the shrubbery in the creek bottoms, feeding along the side hills in the early hours of the morning and evening. During the heat of the day they keep close to the water, in shady trees and the heavy undergrowth. They walk to their feeding grounds, but in going to water they usually fly down from the side hills.

"The love note of the cock has a very peculiar sound, hard to describe. It can be heard at almost any hour of the day in the spring, often in the beginning of March, when there is still plenty of snow to be found, and it is kept up till well into the month of May. It is known as hooting or booming. The cocks when engaged in this amusement may be found perched on horizontal limbs of large pine or fir trees, with their air sacks inflated to the utmost, wings drooping, and the tail expanded. They then present a very ludicrous appearance, especially about the head. When at rest these air sacks, of a pale orange yellow color in the spring, are only noticeable by separating the feathers on the neck and upper parts of the breast, but when inflated they are the size of a medium orange and somewhat resemble one cut in halves. This call is repeated several times in rapid succession, decreasing gradually in volume, but can at any time be heard at quite a distance. It appears to be produced by the sudden forcing of a portion of the air in the sack through the throat, and is quite misleading as to the exact locality whence uttered, the birds being expert ventriloquists.

"I have frequently tried in vain to locate one while so engaged, where there were but few trees in the vicinity; and although I searched each one through carefully, and with a powerful field glass to assist me, I had to give

it up, completely baffled. It is beyond my power to describe this love call accurately. Some naturalists state that it resembles the sound made by blowing into the bunghole of an empty barrel; others find a resemblance to the cooing of a pigeon, and some to the noise made by whirring a rattan cane rapidly through the air. The latter sound comes nearer to it in my opinion than anything else. The closest approach to it I can give in letters is a deep guttural 'muhum,' the first letter scarcely sounded.

"The accounts of the nesting habits of the Sooty Grouse are somewhat vague, the number of eggs to a set being variously given as from eight to fifteen. I have personally examined quite a number of the nests of this Grouse between May 6, 1871, and June 25, 1883. The largest number of eggs found by me in a set was ten in two instances; three sets contained nine each, seven sets contained eight each, and five sets seven eggs or less. The last were probably incomplete, although some of these sets were advanced in incubation. I think that eight eggs is the ordinary number laid by these birds.

"Eggs may be looked for from April 15 to the latter part of May, according to altitude. The earliest date on which I observed eggs of this Grouse was April 18, 1877, when a set was found by Lieut. G. R. Bacon, First Cavalry, containing seven fresh specimens. The nest was placed on the ground among the roots of a willow bush growing under a solitary pine tree in a small ravine 5 miles northwest of Camp Harney, Oregon. The nest was composed entirely of dry pine needles picked up in the vicinity.

"A nest found by me April 22, 1877, about 4 miles west of Camp Harney, was placed under the roots of a fallen juniper tree, in a grove of the same species, growing on an elevated plateau close to the pine belt. This nest was well hidden, a mere depression in the ground, and composed of dry grasses, a few feathers from the bird's breast, and dry pine needles. The nine eggs were about half way imbedded in this mass, and nearly fresh.

"As a rule, most of the nests found by me were placed in similar situations, under old logs or the roots of fallen trees, and generally fairly well hidden from view, and amongst the more open pine timber along the outskirts of the forest proper. Occasionally, however, a nest may be found some little distance from timber, and in the lower parts of mountain valleys. I found such a nest on April 26, 1878, among some bunches of tall rye-grass, in a comparatively open place, and within a yard of Cow Creek, a small mountain stream about 4 miles east of Camp Harney. There was no timber of any size, only small willow bushes, within 2 miles of this nest, which was placed under one of these rye-grass bunches, and the bird sat so close that I actually stepped partly on her and broke two of the eggs in doing so. This nest contained eight slightly incubated eggs. It was composed of dead grass and a few feathers.

"The most exposed nest, without any attempt at concealment whatever, that came under my observation, I found on June 8, 1876, on the northern

slope and near the summit of the Cañon City Mountain, in Grant County, Oregon, at an altitude of about 6,800 feet. I was returning from escort duty to Cañon City, and sent the party with me around by the stage road which wound in zigzag turns up the steep mountain, while with one of my men I took a much shorter, but far steeper, Indian trail which intersected the wagon road again on the summit.

"Near this intersecting point the trail passed through a beautiful oval-shaped mountain meadow of about an acre in extent, near the summit of which stood a solitary young fir tree. No other trees were growing nearer than 30 yards from this one. The meadow itself was covered with a luxuriant growth of short, crisp mountain grass and Alpine flowers, altogether as lovely a spot to take a rest as could well be found. Arriving at this point, and knowing that the party would not be along for more than half an hour at least, I dismounted and unsaddled my horse to let him have a roll and a good chance at the sweet mountain grass, of which opportunities he was not slow to take advantage. Throwing the saddle in the shade made by the little fir I laid down to take a rest myself. I had a fine setter dog with me who had been ranging along both sides of the trail and who came up wagging his tail just as I had settled myself comfortably. Rock, my setter, had approached perhaps within 2 feet of me at a pretty brisk lope, when all of a sudden he came to an abrupt halt, fairly freezing and stiffening in his tracks, and made a dead point alongside of me. I could not understand at first what this meant; even my horse thought it worth the while to stop eating, and with his ears pointed forward was looking in the same direction. Rock, was fairly trembling with excitement, but kept to his point. Jumping up quickly I looked to the right and the rear, thinking that perhaps a rattlesnake might be coiled up in the grass, and saw at once the cause of my dog's strange behavior. It was only a poor Sooty Grouse sitting within 3 feet of me on her nest, containing two chicks and seven eggs on the point of hatching. It was as touching a sight as I had ever seen; the poor bird, although scared nearly to death, with every feather pressed close to her body, and fairly within reach of the dog, still persisted in trying to hide her treasures; and her tender brown eyes looked entreatingly on us rude intruders, and if eyes can speak hers certainly pleaded most eloquently for mercy. She let me almost touch her before she fluttered off her nest, feigning lameness, and disappeared in the undergrowth. Counting the eggs and examining one of the chicks, which apparently had only left the shell a few minutes before, I at once vacated the vicinity and took up a position some 50 yards in an opposite direction from that the bird had taken, to watch further proceedings. The grass was so short that it did not hide the bird, which, after waiting, perhaps ten minutes, came slowly creeping and crouching toward the nest and covered the eggs again. I did not disturb her further, and hope that although her selection of a nesting site so thoroughly exposed was not judicious, she may

have succeeded in rearing her brood in safety. None of the eggs in the nest touched each other; they were all about half covered or imbedded in the material out of which the nest was made—dry grass, pine and fir needles, and a few of the bird's feathers, presumably plucked out by herself."

A very good description of the booming or hooting of the Sooty Grouse is published in Forest and Stream, May 23, 1889, by a correspondent signing himself "Stanstead." The article was sent from Vancouver Island, British Columbia, May 4, an extract from which reads as follows: "While driving near the city with the veteran shot, R. Maynard, we saw a pair of Blue Grouse quite near the trail, and the cock bird gave us a most entertaining exhibition of the charms that he displays in wooing his mate. Like a turkey cock he strutted about with his wings trailing on the ground, his tail feathers erect and spread out fanlike to their fullest extent, his neck distended, and on each side of his neck the feathers were turned out so as to resemble a pair of round white rosettes, nearly 3 inches in diameter, with an oblong red spot in their center where the skin of the neck was exposed. His head seemed to be crowned with a fiery red comb. Excepting the rosettes, he was in appearance a miniature turkey-gobbler. Every few seconds he would strut up to his demure but sleek-looking mate, puff out his neck, and with a jerky movement of his head, utter his boom or hoot, 'boom, boom, boom.' As he grew more and more demonstrative in his actions, his modest mate flew up to an overhanging limb to escape his familiarities, and we drove away, leaving him still strutting on the ground underneath the tree where his mate sat perched. The comb, I should judge, was produced by the spots over the eyes becoming enlarged and inflamed with passion."

According to the observations made by Capt. T. E. Wilcox, assistant surgeon U. S. Army, in the vicinity of Lake Chelan, Washington, in the latter part of August, 1883, the Sooty Grouse will pack at times and gather in large coveys, though not to the same extent as the Pinnated and Sharp-tailed Grouse. He also writes me: "I once caught an old Grouse with a fishhook. I had my rod on my shoulder and suddenly came upon a covey, about the size of Quails, and caught one with my hands. This made the old bird frantic; she attacked me, and alighting on my rod, the hook pierced her foot. I was pulling her in, when my leader broke and she flew off. Of course I released her chicken. I killed a male in the Boisé Mountains, December 2, 1879, which weighed 3 pounds 10 ounces, but some killed by me in the Cascade Mountains seemed to be much larger. While on Lake Chelan in 1883, hunting white goats, I flushed a covey of Grouse, and here heard for the first time the call note of the female for her young. It was low, but distinct, something like that by the Bob White, just before it flushes. At this time, last of August, the birds were well grown. I have always found these birds near water. In 1881, while going to Indian Valley, Idaho, I rode past some, one being near enough to touch with a switch I had in my hand, yet they all walked out of the trail as quietly as domestic fowls would have done, and then resumed their dusting."

But one brood is raised in a season. Incubation lasts, according to different observers, from eighteen to twenty-four days. Females seem to predominate in numbers, but I do not think that these birds are polygamous. Their ordinary note resembles the cackling of the domestic hen very much. The Indian name of the Sooty Grouse on the Northwest coast is "*Tyhee-Cullaw-Cullaw*," "Chief Bird."

According to my own observations, made in various portions of Oregon, Washington, and Idaho, the usual number of eggs laid by the Sooty Grouse is about eight, and occasionally as many as ten are found in a set. Prof. O. B. Johnson, of the University of Washington, Seattle, Washington, informs me, however, that he found as many as sixteen eggs in a nest, and gives the average number from eight to twelve. The former, I think, will as a rule, come nearer to the correct average.

The eggs are ovate in shape, and the ground color varies from pale cream to a cream-buff, the latter being more common. In a single set before me it is a pale cinnamon. The eggs are more or less spotted over their entire surface with fine dots of chocolate or chestnut brown; these spots vary considerably in size in different sets, ranging from the size of No. 3 shot to that of mustard seed. These markings are generally well rounded, regular in shape, and pretty evenly distributed over the entire egg. They never run into irregular and heavy blotches, such as are frequently found in the eggs of the Canada Grouse, *Dendragapus canadensis*, which approach the pattern usually found among those of the Willow Ptarmigan, *Lagopus lagopus*, much nearer than the former. All of these markings can be readily washed off, as well as the overlying ground color, while they are still quite fresh, leaving the shell a delicate pale creamy white. In fact this coloring matter rubs off very readily, and occasionally fresh eggs will not stand even a good wiping. An egg is usually deposited daily and incubation does not begin until the set is completed, the male taking apparently no part in this duty nor in the care of the young after they are hatched.

The average size of ninety-six specimens in the U. S. National Museum collection is 48.5 by 34.5 millimetres. The largest egg of the series measures 52 by 37, the smallest 45 by 32.5 millimetres.

The type specimens show the different variations found in the eggs of the Sooty Grouse, and are all from the Bendire collection, having been collected by the author. No. 21073 (Pl. 1, Fig. 16), is from a set of ten, taken near Camp Harney, Oregon, May 10, 1876; No. 21074 (Pl. 1, Fig. 17), from a set of eight collected on the Canyon City Mountain, Grant County, Oregon, June 8, 1876; No. 21079 (Pl. 1, Fig. 18), from a set of nine, taken May 10, 1877, near Camp Harney, Oregon, and No. 21080 (Pl. 1, Fig. 19), from a set of seven eggs found near Fort Klamath, Oregon, and taken May 22, 1883 The majority of the eggs of this subspecies resemble the specimen figured on Pl. 1, Fig. 18, more than the other types.

## 17. Dendragapus obscurus richardsonii (Sabine).

RICHARDSON'S GROUSE.

*Tetrao richardsonii*, "Sabine MS.," Douglas, Linnæan Transactions, xvi, iii, 1829, 141.

*Dendragapus obscurus richardsonii* Ridgway, Proceedings U. S. National Museum, viii, 1885, 355.

(B —, C 381*a*, R 471*b*, C 558, U 297*b*.)

Geographical range: Northern Rocky Mountains, mainly on eastern slopes, from southern Montana, northeastern Idaho, and eastern British Columbia, north into British America (Liard River).

This distinctly marked race of Dusky Grouse inhabits the timbered regions along the eastern slopes of the Rocky Mountains, from southern Montana and contiguous parts of Idaho northward, through the interior of British North America, to about latitude 61°. It was in the latter vicinity (Liard River) that Mr. J. Lockhart, of the Hudson Bay Company, obtained the most northern specimens of this bird that are in the U. S. National Museum collection.

Like the preceding, it is a resident, and breeds wherever found, and its habits are similar to those of the Dusky Grouse. In northern Wyoming and the eastern parts of central Idaho this Grouse intergrades with its more southern relative, and in northeastern Idaho and western Montana it does the same with the Sooty Grouse. It is a common enough bird in suitable localities throughout the mountainous portions of Montana, especially in the Big Horn Mountains and along the headwaters of the Musselshell River, where I personally met with them. Still, in some sections of this State, apparently quite suited to these birds, where an abundance of good-sized pine timber is found, they are entirely wanting. I have been unable to account for this fact, or to ascertain a good reason therefor, as plenty of good water and an abundance of food is to be found thereabouts.

Mr. Robert S. Williams, of Great Falls, Montana, writes me: "On June 21, 1885, while crossing over the almost bare summit of a small knoll in the foothills of the Belt Mountains, I suddenly almost ran into a brood of young Richardson's Grouse, which had evidently been hatched out but a very short time. The young, about ten in number, were closely huddled together, the old bird standing by their side, with head up, and eyes fairly blazing at the unexpected intruder. I was almost within reach of them, but neither old or young made a single motion or uttered a sound, while I stood watching them for several moments; and I left them in the same position.

"I have often met with coveys a little older, but have never seen the parent bird attempt to draw off the attention of any one by the feints so cunningly carried out by the Ruffed Grouse. These birds feed largely on grasshoppers when such are abundant."

Like the Sooty Grouse, after the young are fairly grown, these birds spend the greater portion of the late summer and autumn along the creek bottoms, fringed with dense thickets of cottonwoods, and many berry-bearing bushes, and at such times they become exceedingly fat[1]. I have seen them fully 10 miles away from any pine timber at this time of the year, and occasionally quite a distance from timber of any kind. Their nesting habits, as far as known, as well as the eggs, are similar in every respect to those of the Dusky and Sooty Grouse. The latter seem to average a trifle smaller, the mean being 47 by 34 millimetres. The largest specimen measures 51 by 34.5, the smallest 43 by 33.5 millimetres. This apparent difference in size can scarcely be taken into account, and is due, no doubt, to the small number (eleven specimens) in the U. S. National Museum collection; the majority of these, all from one set, laid probably by a young bird, are very small, and they reduce the general average considerably. As these eggs are indistinguishable from those of the preceding race none are figured.

## 18. Dendragapus canadensis (Linnæus).

CANADA GROUSE.

*Tetrao canadensis* Linnæus, Systema Naturæ, ed. 10, I, 1758, 159.
*Dendragapus canadensis* Ridgway, Proceedings U. S. National Museum, VIII, 1885, 355. (B 460, C 380, R 472, C 555, U 298).

Geographical range: Northern North America east of the Rocky Mountains, from the northern portions of the New England States, New York, Michigan, and Minnesota northwestward to Alaska (reaching coast at Kadiak, St. Michael, etc.).

The breeding range of the Canada Grouse, or the Spruce Partridge, extends from northwestern Alaska (Kowak or Putnam River) southeastward throughout British North America from ocean to ocean, south to central Minnesota, northern Wisconsin, northern Michigan, northern New York, and northern New England. It must, however, be considered as rather a rare summer resident within the United States, excepting northern Minnesota, where it is said to be common in the immense forests of the northeastern parts of the State, and extending westward to the edge of the prairie at White Earth.[2]

The Canada Grouse is usually resident, and breeds wherever found. At times, however, it is partially migratory during the winter; probably due more to lack of suitable food than to cold, as it has been found in considerable numbers, during the severest kind of weather, as far north as latitude 67°. Its favorite abiding places are the dense thickets of tamarack, *Larix americana*, also called hackmatac, and in groves and swamps of evergreen woods.

Mr. L. M. Turner, in his manuscript on the Birds of Labrador and Ungava, makes the following statement: "The mating season occurs in this locality (Fort Chimo) in the latter part of April or early May. It is said that the

[1] According to Dr. C. Hart Merriam, this Grouse feeds largely on the berries of *Arctostaphylos uva-ursi* and *Ribes cereum*, besides green leaves of the willow and other bushes.

[2] Bulletin II, Dept. of Agriculture, Bird Migration Mississippi Valley, 1888, p. 103.

weather at this season may influence the pairing of this species for two or three weeks later. The males exercise much intrigue to secure the object of their choice for the season, although I have reason to suspect that some of these birds retain their mate for more than one season, as I have frequently found a pair together in the depth of winter, these two being the only ones of the kind to be found in the vicinity.

"Laying begins about the 5th of June, and incubation about the 12th. The young are hatched in about seventeen days. Young birds about five days old were obtained June 28, and others, able to fly, were secured July 10. Through the exertions of Miss Lizzie Ford I was enabled to secure two sets of eggs of this species. The nest consisted merely of a few stalks and blades of grass, loosely arranged among the moss of a higher spot, under the drooping limbs of a spruce, situated in a swamp. A few feathers from the parent bird were also in the nest. The number of eggs in this nest was seven, all quite fresh. A second set, also of seven eggs, was found in a similar situation, and near the location of the nest previously described.

"The food of the Spruce Partridge consists of the tender terminal buds of the spruce, and in winter this seems to be their only food. In a great number of birds examined during that season this was the only substance found in their gizzards, mixed at times with an astonishing quantity of gravel. I was surprised to find these stones of such uniformity of size and material. Crystallized quartz fragments, in certain instances, formed alone the triturating substance, and rarely were there fragments of granite or other stones. In fact many of the birds had not a discolored stone in their gizzard. In the spring and summer months these birds consume quantities of berries of *Empetrum* and *Vaccinium*."

Mr. J. W. Banks, of St. John's, New Brunswick, writes me: "Mr. James Lingley, an old backwoodsman and close observer, found two nests of the Canada Grouse, one on May 4, which was partially hidden under the trunk of a fallen tree. He killed the female with a stick of wood, not knowing she had a nest close by. On picking her up he found an egg she had just laid, and looking around found the nest with seven eggs. May 20 he found a second nest. This was placed between two small fir bushes that grew quite close together, and contained thirteen eggs. In both cases the nests were composed of dried leaves. He also describes the drumming of the male during the mating season, as follows: 'After strutting back and forth for a few minutes, the male flew straight up, as high as the surrounding trees, about 14 feet; here he remained stationary an instant, and while on suspended wing did the drumming with the wings, resembling distant thunder, meanwhile dropping down slowly to the spot from where he started, to repeat the same thing over and over again. The only food he noticed them take was the needles of the fir.'"

On the other hand, Mr. J. H. Yarnall, who has examined the crops of a great number of these birds "never found anything in them but the needles of the hackmatack."

Mr. Manly Hardy, of Brewer, Maine, a reliable and careful observer, writes me as follows: "I have been over every part of this State where this bird is likely to be abundant, east from Penobscot, from the sea to the North Corner Monument, but I have always found the Canada Grouse very scarce everywhere. Five once and six at another time are the largest number I ever saw together. I have many times traveled a month, and sometimes two months constantly in the woods, where they ought to be, without seeing over one or two.

"A Micmac Indian, whom I consider reliable, tells me of having seen a pack of many thousands somewhere east of Halifax, Nova Scotia, on which their whole village lived for weeks, moving after them when they moved. The males greatly preponderate over the females, at least two to one. They feed almost entirely on the needles of spruce and fir, also hackmatack and berries in summer. They show a preference for some fir trees over others, as I have seen them return to the same tree until it was nearly stripped. When disturbed, they always take to the trees, walking about in them, from one branch to another. My father, who had opportunities to see them drum, told me they drummed in the air while descending from a tree. They would fly up on a tree, then start off and drum on the way to the ground, like a Quaker grasshopper. When on the ground they scratch a great deal more than other Grouse do."

Another description of the drumming is as follows: "The Canada Grouse performs its 'drumming' upon the trunk of a standing tree of rather small size, preferably one that is inclined from the perpendicular, and in the following manner: Commencing near the base of the tree selected, the bird flutters upward with somewhat slow progress, but rapidly beating wings, which produce the drumming sound. Having thus ascended 15 or 20 feet it glides quietly on wing to the ground and repeats the manœuvre. Favorite places are resorted to habitually, and these 'drumming trees' are well known to observant woodsmen. I have seen one that was so well worn upon the bark as to lead to the belief that it had been used for this purpose for many years. This tree was a spruce of 6 inches diameter, with an inclination of about 15 degrees from the perpendicular, and was known to have been used as a 'drumming tree' for several seasons. The upper surface and sides of the trunk were so worn by the feet and wings of the bird or birds using it for drumming, that for a distance of 12 or 15 feet the bark had become quite smooth and red as if rubbed."[1]

Mr. Watson L. Bishop, of Kentville, Nova Scotia, has succeeded in domesticating the Canada Grouse, and he has published several very interesting accounts of their habits as observed by him, in the "Forest and Stream," giving its many readers a great deal of new and valuable information about the life-history of these birds, a portion of which I extract. He says: "As the nesting season approaches I prepare suitable places for them by placing spruce

[1] Birds of Maine, Everett Smith, Forest and Stream, February 8, 1883, p. 26.

boughs in such a way as to form cozy little shelters, where the birds will be pretty well concealed from view. I then gather up some old dry leaves and grass and scatter it about on the ground near where I have prepared a place for the nest. The bird pays no attention to this until she wants to lay. She will then select one of these places, and, after scratching a deep cup-shaped place in the ground, deposit in it her eggs. When the hen is on the nest she is continually making a kind of cooing sound, which I have never heard them make on any other occasion. If there should be sufficient material within easy reach of the nest the bird will sometimes cover the eggs up, but not in all cases.

"No nesting material is taken to the nest until after three or four eggs are laid. After this number has been deposited, the hen after laying an egg, and while leaving the nest, will pick up straws, grass, and leaves, or whatever suitable material is at hand, and throw it backward over her back as she leaves the nest, and by the time the set is complete, quite a quantity of this litter is collected about the nest. She will then sit in her nest and reach out and gather in the nesting material and place it about her, and when completed the nest is very deep and nicely bordered with grass and leaves.

"So strong is the habit, or instinct, of throwing the nesting materials over the back, that they will frequently throw it away from the nest, instead of toward it, as the hen will sometimes follow a trail of material that will turn her right about' so that her head is toward the nest, but all the time she will continue to throw what she picks up over her back. This, of course, is throwing the material away from the nest. Discovering her mistake, she will then 'right about face' and pick up the same material that an instant before was being thrown away, and throw it over her back again toward the nest.

"The way they will steal eggs from one another would do credit to a London pickpocket. Two hens had their nests near together, perhaps 2 feet apart, and as each hen laid every other day, one nest would be vacant while the other would be occupied. The hen that laid last would not go away until she had stolen the nest egg from the other nest and placed it in her own. I once saw a hen attempt to steal an egg from another nest that was 20 feet away. She worked faithfully at it for half an hour or more, but did not succeed in moving the coveted egg more than about 8 feet, it being up hill. The egg so frequently got away from her and rolled back a foot or more each time, that she at last got disgusted, and gave up the task. I had no fear of getting the sets mixed, as each was so different in color and shape from the other.

"On going to the pen one evening I found one of the hens on the nest, and I knew she was beginning to sit, as all the others had gone to roost. Slipping my hand under her I found three eggs, the nest egg, the one just laid, and the one stolen from the other nest. I picked two of them up and held them before her, when she all at once placed her bill over the one held between my thumb and forefinger, and tried to pull it out of my hand; I did not let her have it, however, and she immediately stepped upon the side of the nest and placing her bill over the remaining egg, drew it up out of the nest and pushed it back

out of sight, as much as to say 'you have two, and that is all you can have.' I must confess that it was with great reluctance I took these eggs from her, she pleaded so hard for them.

"Anyone who has seen eggs of the Canada Grouse only after they have lain in the nest until the whole set is complete, can have no idea of the beauty of a fresh-laid egg. I have now in my collection about eighty of these eggs, all perfect specimens.

"The male bird begins to strut in March. I remember very well the first time I saw one strutting. I had obtained the bird in the fall, and he used to sit about, bunched up almost in a round ball, as the female did, until one morning, when I went to feed them I found him strutting. His attitude was so different that one would scarcely have known it was the same bird. I went in the house and told my wife to come and see him, remarking that whether the female laid any eggs or not, I was well paid by this sight for all my trouble. I was so interested in seeing him strut that I had the photographer bring his camera in and take some stereoscopic views of him while strutting.

"I will describe as nearly as I can his conduct and attitude while strutting: The tail stands almost erect, the wings are slightly raised from the body and a little drooped, the head is still well up, and the feathers of the breast and throat are raised and standing out in regular rows, which press the feathers of the nape and hind neck well back, forming a smooth kind of cape on the back of the neck. This smooth cape contrasts beautifully with the ruffled black and white feathers of the throat and fore breast. The red comb over each eye is enlarged until the two nearly meet over the top of the head. This comb the bird is able to enlarge or reduce at will, and while he is strutting the expanded tail is moved from side to side. The two center feathers do not move, but each side expands and contracts alternately with each step as the bird walks. This movement of the tail produces a peculiar rustling, like that of silk. This attitude gives him a very dignified and even conceited air. He tries to attract attention in every possible way, by flying from the ground up on a perch, and back to the ground, making all the noise he can in doing so. Then he will thump some hard substance with his bill. I have had him fly up on my shoulder and thump my collar. At this season he is very bold, and will scarcely keep enough out of the way to avoid being stepped on. He will sometimes sit with his breast almost touching the earth, his feathers erect as in strutting, and making peculiar nodding and circular motions of the head from side to side; he will remain in this position two or three minutes at a time. He is a most beautiful bird, and shows by his actions that he is perfectly aware of the fact.

"As the spring and summer advance the food given these Canada Grouse must be changed with the season, and it is only with a perfect knowledge of their wants and with constant care, that they can be safely carried through the heat of the summer and the moulting season. In the nesting season the females are very quarrelsome, and at this time more than two or three cannot

be kept in the same pen, but in July they may be all turned together again, and they will agree very well until the following March."[1]

The Canada Grouse breeds early. Eggs now in the U. S. National Museum collection have been taken by Mr. B. R. Ross, of the Hudson Bay Company, near Fort Simpson, British North America, north of latitude 62°, as early as May 23. But a single brood is raised in a season. The number of eggs to a set varies from nine to thirteen, rarely more, usually about eleven, and in exceptional cases as many as sixteen. An egg is deposited every other day, and incubation does not begin till the clutch is completed. In form the eggs vary from ovate to elongate ovate. Their ground color, which is only superficial, is also very variable, ranging from a pale creamy buff to a decided reddish buff or pale cinnamon, and again to brownish buff with intermediate shades. The eggs are irregularly spotted and blotched with reddish brown or burnt umber. The spots vary considerably in size and shape, but are never close enough together to hide the ground color. An occasional specimen is but very slightly marked, and now and then one may be entirely unspotted.

The average measurement of fifty specimens in the U. S. National Museum collection is 43.5 by 31.5 millimetres, the largest egg measuring 48 by 33, the smallest 41 by 31 millimetres.

Of the type specimens selected to show the variations in color and markings, No. 22367 (Pl. 1, Fig. 20), was taken near Whale River, Ungava Bay, June 3, 1883; Nos. 22398 and 22399 (Pl. 1, Figs. 21 and 22), near Fort Chimo, Northeast Territory, Dominion of Canada, both on July 1, 1884.

These eggs were all collected by Mr. L. M. Turner while on duty as United States signal observer at Fort Chimo, and No. 24024 (Pl. 1, Fig. 23), is from a set of thirteen, laid in confinement in the spring of 1890, and purchased from Mr. W. L. Bishop, Kentville, Nova Scotia. The set from which this specimen is selected is much richer colored than any of the eggs taken from these birds in a wild state, and may be partly caused by the food they received in captivity.

## 19. Dendragapus franklinii (Douglas).

FRANKLIN'S GROUSE.

*Tetrao franklinii* Douglas, Transactions Linnæan Society, xvi, iii, 1829, 139.
*Dendragapus franklinii* Ridgway, Proceedings U. S. National Museum, viii, 1885, 355.
(B 461, C 380*a*, R 472*a*, C 556, U 299.)

Geographical range: Northern Rocky Mountains (chiefly north of the United States) and west to the Coast ranges.

The breeding range of Franklin's Grouse, which still remains one of the rarest birds in the ornithological collections of the United States, extends from about latitude 60°, in southern Alaska, but along the coast only, south through British Columbia and Washington, to northern Oregon, where it reaches its

[1] Forest and Stream, May 29, 1890, p. 367.

southern limit at about latitude 45° Eastward it ranges through the higher mountains of northern and central Idaho, and northwestern Montana to the Belt range. In Alaska, north of latitude 60°, it is replaced by *Dendragapus canadensis*, which likewise reaches the coast here, and the present species occupies but a comparatively small portion of this extensive territory. Within the United States, Franklin's Grouse is perhaps most common in suitable localities throughout northern and central Idaho, in the almost impenetrable and densely timbered mountain ranges bordering the headwaters of the north and south forks of the Clearwater, and the tributaries of the Salmon River. Throughout this region this species is known as the "Fool Hen;" an eminently proper and well-deserved name, it being entirely unsuspicious, allowing itself frequently to be knocked off the trees with sticks or stones, and it can often be caught by hand.

My friend, Dr. T. E. Wilcox, U. S. Army, says: "The cocks of this species are fearless and pugnacious, refusing to flee from man, and even attacking an intruder. I have been able to get within 3 or 4 feet before they would hop to another branch or twig. I always found them near running water or along the borders of high marshes. Its flight is not noisy like that of other Grouse or Partridges."

Mr. George Bird Grinnell says: "When alarmed or uneasy, Franklin's Grouse, as well as the Dusky Grouse, has the habit of erecting the feathers of the neck just below the head. This is done very commonly, and gives the bird a very odd appearance. It is analogous to the habit of the Ruffed Grouse, which, under the influence of certain emotions, erects the black ruff, and as does the Pinnated Grouse its little falciform feathers on the neck."

While stationed at Fort Lapwai, Idaho, from 1868 to 1871, I saw these birds on several occasions, and learned a good deal about them from packers and trappers. In those days the town of Lewiston, situated at the junction of the Snake and Clearwater Rivers, 11 miles west of Fort Lapwai, was the main supply depot for the various mining camps in northern Idaho, and every pound of freight for the mines had to be carried there on pack mules. The main trails to Oro Fino, Florence, and Warrens, the three principal mining centers at that time, passed right through the garrison, and it was no unusual sight for a half dozen pack trains, numbering a couple of hundred mules, to pass by there in a day. The route followed by these trains passed, for a portion of the way at least, over as rough and rugged a country as can be found anywhere, up one mountain and down another; some places being so rocky and steep that it seemed impossible for the heavily laden mules to keep their footing, and the underbrush so dense and thick on either side that it was almost impenetrable. The few narrow mountain valleys met with were no better. The melting of the deep snows rendered them nearly bottomless during the greater portion of the summer, making them a shaking, trembling quagmire in which the poor mules floundered up to their bellies in mud and mire. If you desired to become

acquainted with the habits of Franklin's Grouse your inclination might be gratified in such localities as here described, viz, along the edges of wet or swampy mountain valleys, the so-called "Camas prairies," or the borders of the numerous little streams found in such regions among groves or thickets of spruce and tamarack. Few naturalists have as yet been sufficiently interested to invade their favorite haunts. They are also quite abundant on the Lolo trail over the Bitter Root Mountains, from the Nez Percé Indian Reservation to Missoula, Montana. I have met with them here as well as in the Salmon River Mountains, south of Mount Idaho, at an altitude of from 6,000 to 9,000 feet, during the Nez Percé campaign in the summer of 1877, but had no time then to observe their habits closely.

In the summer of 1881 I found a single covey, numbering about ten birds, in the low, flat and densely timbered region between the southern end of Pend d'Oreille Lake (the old steamboat landing) and Lake Cœur d'Alène, Idaho, at an altitude not exceeding 3,500 feet, I should think. I bagged three of these birds, and was quite surprised to find them in such a locality. As far as I have been able to learn, they usually occurred only at altitudes from 5,000 to 9,000 feet, and scarcely ever left the higher mountains. They were scratching in the dust on the trail I was following, and simply ran into the thick underbrush on each side, where they were quickly hidden.

Franklin's Grouse is a constant resident wherever found, and abundant enough in certain localities. Large numbers are yearly killed by both Indians and packers; in fact, this Grouse seems to furnish the latter their principal fresh-meat supply during the summer months, and they are by no means unpalatable at this time, as they feed more or less on various berries and grasshoppers, and not so much on the buds and leaves of the spruce and tamarack, as at other seasons of the year.

According to the best information obtainable, but a single brood is raised in a season, and their actions and drumming during the mating season are similar to those of the Canada Grouse. Nidification begins during the latter part of May or the beginning of June, depending somewhat on altitude and the season. The nesting habits and number of eggs laid to a set appear to be similar to those of the former species. There are no full sets of eggs in the U. S. National Museum collection.

Among an extremely interesting collection of birds' nests and eggs, made by Mr. R. MacFarlane, chief factor of the Hudson Bay Company, near Stewart Lake, New Caledonia District, British Columbia, during the season of 1889, and throwing much light on the distribution of a number of species found in this little known and practically unexplored territory, are two incomplete sets of eggs of this bird.

Three eggs of Franklin's Grouse and one of the Canadian Ruffed Grouse were found in one nest by an Indian near Babine, in the latter part of May, 1889, and a second nest, also containing three eggs, was brought to Mr. MacFarlane with the parent, by another Indian, who found it near Fort St.

James, on June 9 of the same year. The nest was merely a slight depression in the ground, and was lined with a few decayed leaves. Two of the eggs contained well-formed embryos and the third was addled.

Through the kindness of Mr. W. E. Traill, in charge of one of the Hudson Bay Company posts in British Columbia, parts of three sets of these rare eggs, fifteen in number, were collected during the season of 1890; taken on May 20, 27, and 30, respectively. The nests were shallow depressions in the moss-covered ground, lined with bits of dry grass, and were placed at the borders of spruce thickets. The eggs were fresh when found. They resemble those of the Canada Grouse in shape, color, and markings, but average a trifle smaller.

The average size of twenty-three specimens in the U. S. National Museum collection is 42 by 31 millimetres; the largest egg measuring 45 by 32.5, the smallest 38.5 by 30 millimetres. As they are similar to those of the preceding species, none are figured.

## 20. Bonasa umbellus (Linnæus).

RUFFED GROUSE.

*Tetrao umbellus* Linnæus, Systema Naturæ, ed. 12, I, 1766, 275.
*Bonasa umbellus* Stephens, General Zoölogy, XI, 1819, 300.
(B 465, C 385, R 473, C 565, U 300.)

Geographical range: Eastern United States, west to edge of Great Plains (?); north to Massachusetts (lowlands), Minnesota, southern Ontario, Canada; south to northern South Carolina and northwestern Georgia (uplands), Tennessee, Arkansas, etc.

The typical Ruffed Grouse or Partridge of the Northern States and the Pheasant of the South, inhabits and breeds throughout the wooded sections of the eastern United States, from Massachusetts westward, through New York, Pennsylvania, Ohio, Michigan, Wisconsin, Minnesota, and the southeastern portions of North and South Dakota, thence south through southeastern Nebraska and Missouri, the mountainous regions of Arkansas, eastern Tennessee, western North Carolina, northeastern Alabama, northwestern Georgia, and northern South Carolina, as well as in the remaining States included within the boundaries mentioned. Throughout its southern range the Ruffed Grouse is mostly confined to the mountain regions, and is seldom if ever found in the lowlands during the breeding season. In the New England States north of Massachusetts it intergrades with *B. umbellus togata*, the majority of the specimens found throughout southern Maine, New Hampshire, Vermont, and northern New York being scarcely referable to either form, birds found in the high lands approaching the Canadian Ruffed Grouse, while those in the valleys, are nearer typical *Bonasa umbellus*. The Ruffed Grouse found in southern Ontario, Canada, are referable to this race

It is generally a resident and breeds wherever found, ranking with the Bob White in importance as a game bird. The Ruffed Grouse is naturally tame and unsuspicious, and let it once realize that it is protected it becomes almost as much at home in the immediate vicinity of man as a domestic fowl, and quickly learns to know its friends. At the fine country residence of the Hon. Clinton L. Merriam, near Locust Grove, New York, especially during the winter, it is not an unusual sight to see several of these handsome birds unconcernedly walking about the shrubbery surrounding his home, and even coming on the veranda of the house to feed. They, like many other animals about the place, have learned that here at least they are among friends, and plainly show their full confidence in them. Even during the mating season a cock Grouse may frequently be seen in the act of drumming within 50 yards of some of the outbuildings.

How different are the habits of these birds from those of the Ruffed Grouse as we usually see them. From the almost constant persecution they are subjected to throughout the year, in the more thickly settled portions of the United States at least, they have become a most cunning and extremely wary bird, and it takes a quick eye as well as steady nerves to arrest its swift and powerful flight when once on the wing and bring it to bag.

Notwithstanding the army of sportsmen, who leave this bird but little rest during the open season, and the great number annually snared, the numerous four-footed enemies it has to contend with during the breeding season, including cats, mink, weasels, foxes, and squirrels, as well as crows and birds of prey—like a few of the hawks and owls, which destroy either the eggs or young—and natural causes, such as wet and cold seasons, which are also exceedingly destructive to the newly-hatched young, this noble game bird seems, nevertheless, to hold its own fairly well over the greater portion of its range, and while they may be scarce one season, in the next they may be comparatively common.

The Ruffed Grouse is partial to an undulating and hilly country, one well wooded and covered with considerable undergrowth, interspersed here and there with cultivated fields and meadow lands. In the southern portions of its range, this bird is confined to the more mountainous and Alpine regions, being seldom found far away from such places, excepting in the late fall. As winter approaches, the coveys leave their feeding grounds in the mountains and repair to more congenial haunts along the edges of the neighboring valleys.

The mating season occasionally commences early in February, but usually about the beginning of March, when the familiar drumming of the male may be frequently heard, though the bird is not often seen. This drumming of the Ruffed Grouse has been often described, and many different theories have been advanced as to how the sound is produced. It is generally conceded now by most naturalists, including such well-known ornithologists as Brewster, Merriam, and Henshaw, that the sound is produced by the outspread wings of the bird being brought suddenly downward against the air, without striking anything.

Mr. Manly Hardy, of Brewer, Maine, well known as a reliable student of nature and a careful observer, describes the drumming as follows:

"The cock Grouse usually selects a mossy log, near some open hedge, clearing, or woods road, and partly screened by bushes, where he can see and not be seen. When about to drum he erects his neck feathers, spreads his tail, and, with drooping wings, steps with a jerking motion along the log for some distance each way from his drumming place, walking back and forth several times and looking sharply in every direction; then, standing crosswise, he stretches himself to his fullest height and delivers the blows with his wings fully upon his sides, his wings being several inches clear from the log. After drumming he settles quietly down into a sitting posture, and remains silently listening for five or ten minutes, when, if no cause for alarm is discovered, he repeats the process."

The drumming place is resorted to by the male from year to year. It may be a log, a rock, an old stump, or when such are not available, a small hillock is made to answer the purpose equally as well. While this drumming can not be considered a love note, as it may be heard almost every month in the year, and sometimes in the night as well as in the daytime, yet it must undoubtedly have some attraction for the female, and I think is performed as a sign of bodily vigor and to notify her of his whereabouts. Occasionally it causes a jealous rival to put in an appearance also, when a rough-and-tumble fight ensues. The female is seldom seen near the drumming place.

No game bird is more courageous than the Ruffed Grouse in the defense of its young; and the various tactics made use of, such as feigning injury, and fluttering along the ground just out of reach, are well known and often successful.

By many persons the Ruffed Grouse is considered polygamous, and while I can not actually disprove this assertion I doubt it very much.

The nest, like that of all the Grouse family, consists of a slight hollow scratched out at the base of a standing tree, a rock, under or alongside an old log, the fallen top of a tree, a brush pile, an old fence corner, or in the tangled undergrowth and thickets near a stream. Usually it is well and securely hidden, and placed in a secluded locality. Now and then, however, a nest will be found in quite an exposed and unlikely place, without any pretense at concealment. I have a photograph of such a one before me now, showing the bird on the nest. It was placed amongst a lot of fallen leaves, alongside the trunk of a tree, apparently a spruce, and close to a fence, in quite an open place.

Mr. Lynds Jones, of Grinnell, Iowa, found a nest of the Ruffed Grouse in a hollow stump, and Mr. C. M. Jones, of Eastford, Connecticut, found one in a swamp, on a little cradle knoll, surrounded by water. Mr. William N. Colton, of Biddeford, Maine, records a nest found between the stems of three young birches, fully 8 inches from the ground.

The nest itself is a very slight affair, and does not take long to construct. It is lined with a little dry grass, dead leaves, pine needles, or whatever is most conveniently found in the immediate vicinity of the nesting site.

Occasionally the Ruffed Grouse breeds very early, even in the more northern portions of its range. I have reliable records of full sets of eggs found in central New York as early as April 1 and April 2. Usually, however, the beginning of May is the breeding season of this species. If the bird is disturbed on the nest and the eggs are handled before the complete number has been laid and incubation fairly begun, it will frequently abandon its nest. The male leaves his mate as soon as she commences to sit, and apparently does not join the family again until the young are nearly fully grown. Incubation lasts from twenty-four to twenty-eight days, and but a single brood is raised in a season. If there are exceptions to this rule they are rare.

When incubation is somewhat advanced the Ruffed Grouse is loath to leave her eggs, and will allow herself to be very closely approached, relying on her color and motionless attitude for protection.

Mr. Lynds Jones writes me that he once stepped directly over a sitting bird without knowing it until the bird flew off behind him. Mr. A. S. Johnson, of Hydeville, Vermont, relates a similar experience, as follows: "I stood within 2 feet of a Ruffed Grouse sitting on her nest, which did not as much as wink till I stooped over closer to see how near she would let me approach. Then she slipped off the nest and skulked off 4 or 5 rods, stopping then to watch what I was going to do. The nest contained ten eggs. I passed by the spot several times after this and saw the bird on the nest each time, but did not disturb her."

The young are able to run about as soon as out of the shell and are cared for by the mother as a hen manages her brood. Their food at first consists almost entirely of insects (such as ants, beetles, small larvæ, and grasshoppers) and worms. When a little older they are taken to old wood roads for the double purpose of feeding on berries and such grain as is found among the droppings of horses, and more especially to take dust baths in order to free themselves from vermin. The cluck of the mother resembles that of the common barnyard fowl, only it is more subdued. When suddenly alarmed, a shrill squeal is given by the female; this, according to Dr. William L. Ralph, resembles very much the whining of a young puppy; and while the parent faces the intruder with every feather raised, the young hide quickly under anything in the vicinity that may afford protection, and they remain there perfectly quiet until called together again by their parent.

Till about half grown the Ruffed Grouse roosts with her young on the ground, afterward in trees. They do not pack at any time of the year, but remain in coveys, or what is left of these, seldom more than six or eight birds being found together.

During the summer and fall the food of the Ruffed Grouse is quite varied. Dr. A. K. Fisher, of the Department of Agriculture, Washington, District of

Columbia, writes me on this subject as follows: "The Ruffed Grouse is very fond of grasshoppers and crickets as an article of diet, and when these insects are abundant it is rare to find a stomach or crop that does not contain their remains. One specimen, shot late in October, had the crop and stomach distended with the larvæ of *Edema albifrons*, a caterpillar which feeds extensively on the leaves of the maple. Beechnuts, chestnuts, and acorns of the chestnut and white oaks are also common articles of food. Among berries early in the season, the blackberries, blueberries, raspberries, and elderberries are eaten with relish, while later in the year the wintergreen (*Gaultheria*), partridge berry (*Mitchella*), with their foliage, sumach berries (including those of the poisonous species), cranberries, black alder (*Ilex*), dogwood (*Cornus*), nannyberries (*Viburnum*), and wild grapes form their chief diet. In the fall the foliage of plants often forms a large part of their food, that of clover, strawberry, buttercup, wintergreen, and partridge berry predominating.

"A fine male, shot at Lake George, New York, November 1, 1889, had the crop and stomach distended with the leaves of the peppermint. In the winter these birds feed on the buds of trees, preferring those of the apple, ironwood, black and white birch, and poplar."

The number of eggs to a set varies from eight to fourteen; about eleven may be called a fair average. If the first set is destroyed, a second and usually a smaller one is laid. Sets of sixteen eggs or over are of rare occurrence, but I have a reliable record of one numbering twenty-three eggs. Mr. John T. Paintin, of Coralville, Johnson County, Iowa, found this set May 26, 1886, near the Iowa River, 10 miles north of Iowa City. He was walking along in the timber, and in stepping over a rotten log almost stepped upon the Grouse. The eggs were carefully counted and the number found to be twenty-three; they were almost hatched, and were not disturbed.

In form they are ovate, or short ovate, their ground color varying from milky white to pinkish buff. About one-half of the eggs in the U. S. National Museum collection are more or less spotted with rounded dots, varying in size from a No. 4 shot to mustard seed or dust shot. These markings vary from pale reddish brown to drab color, and none of the eggs are heavily marked.

The average measurement of forty-four specimens in the U. S. National Museum collection is 38.5 by 30 millimetres, the largest egg of the series measuring 40 by 32, the smallest 33 by 25 millimetres.

As there is practically no difference in the eggs of the geographical races of the Ruffed Grouse, the type specimens figured have been selected with the object of showing as nearly as possible the variations both in ground color and markings, irrespective of race, similar specimens being sure to be found in a sufficiently large series of each form.

The type specimen of *Bonasa umbellus* (No. 23308, Pl. 2, Fig. 1), selected from a set of eight eggs collected by Mr. C. W. Richmond, near Harper's Ferry, West Virginia, May 30, 1885, represents one of the lightest colored specimens in the entire series, and is perfectly plain colored and unspotted.

## 21. Bonasa umbellus togata (Linnæus).

CANADIAN RUFFED GROUSE.

*Tetrao togatus* Linnæus, Systema Naturæ, ed. 12, 1766, 275.
*Bonasa umbellus togata* Ridgway, Proceedings U. S. National Museum, viii, 1885, 355.

(B —, C —, R —, C, — U 300*a*.)

Geographical range: British Columbia, Washington and Oregon, excepting the coast districts, and from Idaho north and eastward to James Bay (Moose Factory), northern and central Maine and Nova Scotia; south occasionally in the mountains of New England and northern New York.

This race inhabits and breeds in the wooded districts from the mouth of the St. Lawrence River, westward through central and northern Maine and thence throughout the British possessions to the eastern slopes of the Cascade Range in Washington and Oregon, as far south at least as Fort Klamath, close to the boundary line of California. On the western slopes of the Bitter Root Mountains it reënters the United States, and is the typical form found throughout northern and middle Idaho, Oregon, and Washington east of the Cascades. Thence it ranges northward along the eastern spurs of the Fraser River and Cariboo Mountains to Fort St. James, Stewart Lake, New Caledonia district, in British Columbia, where it is common to about latitude 56°, and probably still further north in this direction.

In the central Rocky Mountain region the range of the Canadian Ruffed Grouse is locally intercepted by the southern extension of that of *B. umbellus umbelloides*, the latter being more of an Alpine form, and seemingly restricted to the mountainous sections.

The habits of this race are very similar to those of the common Ruffed Grouse. Throughout Canada and the British possessions it is better known by the name of Partridge and Birch Partridge.

Mr. Ernest E. Thompson, of Toronto, Canada, has kindly placed his field notes on this race at my disposal, and I make the following extracts from them: "Every field man must be acquainted with the simulation of lameness, by which many birds decoy or try to decoy intruders from their nests. This is an invariable device of the Partridge, and I have no doubt that it is quite successful with the natural foes of the bird, indeed it is often so with man. A dog, as I have often seen, is certain to be misled and duped, and there is little doubt that a mink, skunk, raccoon, fox, coyote, or wolf, would fare no better. Imagine the effect of the bird's tactics on a prowling fox; he has scented her as she sets, he is almost upon her, but she has been watching him, and suddenly with a loud 'whirr' she springs up and tumbles a few yards before him. The suddenness and noise with which the bird appears causes the fox to be totally carried away; he forgets all his former experience, he never thinks of the eggs, his mind is filled with the

thought of the wounded bird almost within his reach; a few more bounds and his meal will be secured. So he springs and springs, and very nearly catches her, and in his excitement he is led on, and away, till finally the bird flies off, leaving him a quarter of a mile or more from the nest.

"If instead of eggs the Partridge has chicks, she does not await the coming of the enemy, but runs to meet and mislead him ere yet he is in the neighborhood of the brood; she then leads him far away, and returning by a circuitous route, gathers her young together again by her clucking. When surprised she utters a well-known danger signal, a peculiar whine, whereupon the young ones hide under logs and among grass. Many persons say they will each seize a leaf in their beaks and then turn over on their backs. I have never found any support for this idea, although I have often seen one of the little creatures crawl under a dead leaf. On July 8, 1884, while exploring in the Carberry spruce bush, Manitoba, with a friend, we passed a tree at whose roots was a Partridge's nest, but we would not have discovered it had not the mother pursued us some .20 feet and begun a vigorous attack on our legs, whereupon we turned and found the nest. It was just at that critical moment when the young were coming out. Those that were hatched, some six or eight, hid so effectually within a space of 6 feet that no sign of them could be seen. After their first rush, and once hidden, they ceased their plaintive 'peeping' and maintained a dead silence. Meanwhile the mother was sorely distressed, running about our feet with drooping wings, whining grievously, in such entire forgetfulness of herself and in such agony of anxiety for her young, that the hardest hearted must have pitied her and have felt constrained to leave her in peace, as we did."

Mr. Manly Hardy states: "The young run as soon as they chip the egg. If disturbed when only a few days old, the hen immediately flies at the intruder, making a loud noise, often striking him in the face or breast. The young usually drop where they are, remaining perfectly motionless. The parent throws herself on her breast and kicks herself along with her feet, aided by her spread wings, making a loud squealing noise. She goes just fast enough so that the pursuer can not quite get his hand on her, recovering, in a rod or two, to seem only broken-winged, and a short distance further on suddenly darting off. If one keeps quiet, in a short time she returns to the vicinity and calls her chicks, who come out of their hiding places and rejoin her. I have once seen the old cock with the brood, and on this occasion he gallantly defended the rear, until the rest made good their escape. He stood with wings raised and tail spread, ready to fight the intruder. I have seen the young fly into a tree when still in the yellow down; and when not larger than a Pine Grosbeak they will fly long distances, giving the alarm note of 'quit, quit,' just like an old bird. The young, a few days old, are shyer than the wariest adults. The noise made by the Ruffed Grouse in flying '*is made on purpose*' to alarm others in the vicinity; they can fly as quietly as any bird if they choose.

"The males never congregate during the breeding season or after, and I never but once saw two adult males within one-fourth of a mile of each other between April and September. I consider that the drumming is not a call to the female, as they drum nearly or quite as much in the fall as in the spring, and I have heard them drumming every month in the year. I have never seen the least evidence that the Ruffed Grouse is polygamous."

Besides the various foods mentioned in the previous article, the Canadian Ruffed Grouse, according to Mr. Hardy, feeds not alone on the poplar buds, but also on the hard old leaves. He writes me: "I have killed one with its crop filled with such leaves on the 20th of August, and they eat them continuously, until the last have fallen in late October. They do this when other food is abundant. Buds of willow, yellow and white birch, hophornbeam, thorn plums, rosehips, leaves of tame sorrel, of the rock polypod, fungus from birch trees, the seeds of touch-me-nots (*Impatiens fulva*), wild raisins, and highland cranberries (both species of *Viburnum*) form also a part of their bill of fare. They seem to be especially fond of beechnuts. I have a record of finding seventy-six in one bird's crop and over sixty in another."

Personally, I have met with this bird quite frequently in various portions of Oregon and Washington, as well as in the north of Idaho, where it was especially abundant and exceedingly tame and unsuspicious. On the trail from Fort Lapwai, Idaho, to Fort Colville, Washington, in 1869 to 1871, I have seen, more than once, over fifty of these birds in a day's travel, without looking for them. Coveys of from eight to twelve were frequently met lying in any dusty place on the trail, taking sun baths and scratching around like chickens. When closely approached they would hop up or fly into the nearest tree or bush and remain there perfectly unconcerned, and I have seen them knocked down with sticks and stones.

On one of these trips, in the beginning of June, 1870, I saw a Ruffed Grouse, with a brood of young, attack an Indian dog that had attached itself to our party, and drive him off. We were riding through a little aspen thicket, some 10 miles north of the Spokane River, when the dog suddenly ran on the bird with her brood. She certainly looked the very incarnation of fury, every feather on her body was standing on end, as she fairly flew at the dog, perfectly reckless of consequences; but was so nimble and quick in her movements that she escaped all harm, and actually compelled the dog, by various peckings on the legs and head, to turn tail and run. At the same time she uttered a sharp, hissing sound of defiance rather than fear, which reminded me more of the hissing and spitting of an angry cat than anything emanating from a bird.

The nesting habits of the Canadian Ruffed Grouse, as well as the eggs, are in every respect similar to those of typical *Bonasa umbellus*. Mr. J. W. Banks, of St. Johns, New Brunswick, writes me: "Here with us a very common nesting place is what is called a fallow. This is a piece of woods chopped down in the fall, to be burned when sufficiently dry, usually in the

latter part of May or early in June. Being composed chiefly of spruce and fir, it burns very rapidly. I found two nests (or rather the remains, for the eggs were badly scorched) in one of these burnt fallows, and a few feet from each nest the bones of the mother Grouse. A farmer acquaintance told me of finding a nest of this bird, which contained ten eggs, in a fallow he was about to burn, and knowing of another nest with an equal number of eggs, the thought occurred to him to put the eggs in the nest of the other bird that would not be endangered by the fire, and watch developments. He had the satisfaction of knowing that the eggs were hatched."

A nest of this Grouse was found by Mr. R. MacFarlane, of the Hudson Bay Company, near Fort St. James, British Columbia, May 16, 1889. It contained eight nearly fresh eggs, and was placed close to the foot of a pine tree in a slight depression scratched out by the bird. It was sparingly lined with grass, dry leaves, and a few feathers, and situated near a small lake; the female was snared on the nest. Judging from the number of skins of this Grouse, sent on at the same time, it must be quite common there.

But one brood is raised in a season. Incubation lasts from twenty-four to twenty-eight days, and does not begin until the clutch is completed, an egg, I believe, being deposited daily. The number of eggs to a set varies from eight to fourteen, rarely more. In form and color these are indistinguishable from those of the former subspecies. In size they average a trifle larger. The mean measurement of thirty-nine specimens in the U. S. National Museum collection is 40 by 31 millimetres, the largest egg of the series measuring 44 by 33, the smallest 37 by 29 millimetres. The type specimen, No. 4772 (Pl. 2, Fig. 2), selected from a set of eight, one of the darkest colored and most distinctly marked eggs of the entire series, was obtained by J. R. Willis, near Halifax, Nova Scotia, June, 1861.

## 22. Bonasa umbellus umbelloides (Douglas).

GRAY RUFFED GROUSE.

*Tetrao umbelloides* Douglas, Transactions Linnæan Society, xvi, 1829, 148.
*Bonasa umbellus* var. *umbelloides* Baird, Birds of North America, 1858, 925.
(B 465*, C 385*a*, R 473*a*, C 566, U 300*b*.)

Geographical range: Rocky Mountain region of the United States and British America, north to Alaska, east to Manitoba.

The Gray Ruffed Grouse, the lightest colored of the forms of *Bonasa*, in which the gray tints strongly predominate over all others, inhabits the central Rocky Mountain system, from latitude 65° (Kaltag Mountains, near the head of Norton Sound) and the valley of the Yukon River in Alaska, south and southeast along the Yukon and Mackenzie Rivers, through British North America, eastern Idaho, Montana, western North Dakota, Wyoming, Utah, and Colorado. Like the preceding, it is generally a resident and breeds wherever found.

This well-marked and easily recognized subspecies, within the United States inhabits the dense undergrowth usually found along the sides of cañons and the clear mountain streams running through these, from an altitude of 7,000 to 10,000 feet, and, excepting in the fall and winter, it is rarely seen in the lower foothills or plains. Considering the isolated localities it inhabits, where it is seldom molested by man, it is an extremely shy bird, much more so than the Canadian Ruffed Grouse, and is not nearly so abundant as the latter. It habits are similar; and, besides the usual food used by the members of this family, in the late fall it feeds, to a great extent, on the leaves and fruit of a species of wild plum, growing in abundance along the foothills of the Big Horn Mountains in Montana, where, at that time of the year, it is often found associated with the Sharp-tailed Grouse, and not uncommon. The "*ruffs*," instead of being of the usual dark color, are, in an occasional specimen, of a beautiful bronze or coppery hue.

The nesting habits also, as well as the eggs of the Gray Ruffed Grouse, are in no way different from those of the preceding subspecies.

Mr. Robert S. Williams, of Great Falls, Montana, writes me: "I found a nest of this subspecies July 3, 1889; it was placed under the trunk of a fallen cottonwood tree, which rested about a foot from the ground. Otherwise the nest was not concealed in any way. The eggs, eleven in number, were evidently about to hatch, and I did not disturb them. Visiting the nest the succeeding day, the old bird let me climb over the fallen trunk above her without leaving the eggs."

Mr. W. H. Dall, U. S. Coast Survey, found the Gray Ruffed Grouse nesting near Nulato, Alaska, in May, and a set of eggs were found in an old willow stump. The average measurement of twenty-nine eggs in the U. S. National Museum collection is 40.5 by 30 millimetres. The largest egg of the series measures 43 by 31.5, the smallest 38 by 30 millimetres. The type specimen, (No. 22830, Pl. 2, Fig. 3), was taken May 18, 1886, by Mr. Ernest E. Thompson, near Carberry, Manitoba. It is of a pure rich cream color and unspotted.

## 23. Bonasa umbellus sabini (Douglas).

OREGON RUFFED GROUSE.

*Tetrao sabini* Douglas, Transactions Linnæan Society, xvi, iii, 1829, 137.
*Bonasa umbellus* var. *sabinei* Coues, Key to North American Birds, 1872, 235.
(B 466, C 385*b*, R 473*b*, C 567, U 300*c*.)

Geographical range: Coast Mountains of northern California, Oregon, Washington, and British Columbia.

The range of the Oregon Ruffed Grouse, the darkest and handsomest race of the genus *Bonasa*, is restricted to the wooded portions of country between the western slopes of the Coast Range and the Pacific Ocean, as well as the islands adjacent thereto. It is found from about latitude 57°, in the vicinity of Sitka, Alaska, south through western British Columbia, western Washington,

western Oregon, and northwestern California, it having been taken near Humboldt Bay. Like the preceding, it is a constant resident and breeds wherever found, its general habits differing in no particular from those of its allies. In central Washington and Oregon it intergrades with the Canadian Ruffed Grouse, the majority of specimens approaching closer to the last-mentioned race.

According to Dr. Suckley, owing to the mildness of the season in the vicinity of Fort Steilacoom, the males commence drumming as early as January, and in February they are heard to drum throughout the night. In the autumn they collect in great numbers in the crab-apple thickets near the salt marshes at the mouths of the rivers emptying into Puget Sound. There they feed for about six weeks on the ripe fruit of the northwestern crab-apple, the *Pyrus rivularis* of Nuttall.[1]

Nidification begins about the middle of April and lasts sometimes till late in June. April 14 is the earliest date I have on which eggs have been found—a record given me by Prof. O. B. Johnson, of the Washington University, Seattle, Washington.

The number of eggs to a set varies from seven to thirteen, rarely more. A small set of six, partly incubated, were collected for me near North Saanich, Vancouver Island, British Columbia, June 28, 1876; probably a second laying, the first brood having been destroyed. The nest, a slight hollow in the ground scratched out by the bird, was placed under the fallen branches of a spruce tree. The cavity was lined with dead leaves and spruce needles, as well as a few feathers. This nest was found close to a small creek and was well concealed. Mr. A. W. Anthony found a nest in a similar situation near Beaverton, Oregon, on May 16, 1885. It contained seven eggs and incubation had commenced. A single brood is usually reared in a season.

The average measurement of twenty specimens in the U. S. National Museum collection is 41 by 30.5 millimetres, the largest egg of the series measuring 44 by 31.5, the smallest 38 by 29 millimetres. The type specimen (No. 6886, Pl. 2, Fig. 4) was taken by Mr. James Hepburne, near Victoria, British Columbia, in the spring of 1862.

## 24. Lagopus lagopus (Linnæus).

WILLOW PTARMIGAN.

*Tetrao lagopus* Linnæus, Systema Naturæ, ed. 10, I, 1758, 159.
*Lagopus lagopus* Stejneger, Proceedings U. S. National Museum, VIII, 1885, 20.
(B 467, 470, C 386, R 474, C 568, U 301.)

Geographical range: Northern portions of northern hemisphere, south in winter, in America to Sitka, Alaska, the British provinces, and occasionally within the northern border of the United States.

The breeding range of the Willow Ptarmigan, or Willow Grouse, is confined to the Arctic regions of America, the so-called fur countries, seldom

[1] History of North American Birds, 1874, B. B. and R., Vol. III, p. 454.

extending further south than latitude 55°, and then only in the eastern portions of its range, in Labrador and the shores of Hudson Bay. In winter these birds are partly migratory, and are sometimes found in considerable numbers as far south as latitude 50°, and stragglers on rare occasions have been taken within the northern borders of the United States. According to Richardson, considerable numbers remain in the wooded tracts, as far north as latitude 67° even in the coldest winters.

Mr. E. W. Nelson states: "In the northern portions of their respective range these Grouse are summer residents, frequenting the extensive open country and being most abundant along the barren seacoast region of Bering Sea and the Arctic coast; but in autumn, the last of August and during September, they unite in great flocks and migrate south to the sheltered banks of the Kuskokwim and Yukon Rivers, and their numerous tributaries. In early spring as the warmth of the returning sun begins to be felt, they troop back to their breeding grounds once more.

"During a large portion of the year these birds form one of the most characteristic accompaniments of the scenery in the northern portion of Alaska During the winter season these birds extend their range south to Sitka and Kadiak, from whence specimens in white plumage are in the U. S. National Museum collection.

"Toward the end of March, as the small bare spots commence to show on the tundra, the Eskimo say, this will bring the Ptarmigan from the shelter of the interior valleys, and their observation proves true.

"At St. Michael these birds commence their love-making according to the character of the season. In some years by the 1st of April their loud notes of challenge are heard; but the recurrence of cold weather usually puts a temporary stop to their proceedings. About the 5th or 15th of this month the first dark feathers commence to appear about the heads and necks of the males. During some seasons the males make scarcely any progress in changing their plumage up to the middle of May, when I have frequently seen them with only a trace of dark about the head and neck. In the spring of 1878 the first males were heard calling on the 26th of April, and on April 27, in 1879, the males were just commencing to moult, showing a few dark feathers, but the seasons were unusually late. In autumn the change frequently commences the last of September, and by the first of October it is well under way, the winter moult being completed towards the end of this month.

"At the Yukon mouth in the evening of May 24, these Ptarmigan were heard uttering their hoarse notes all about. As we were sitting by the tent my interpreter took my rifle, and going off a short distance worked a lump of snow to about the size of one of these birds. Fixing a bunch of dark-brown moss on one end of the snow to represent the bird's head, he set his decoy upon a bare mossy knoll; then retiring a short distance behind the knoll he began imitating the call of the male until a bird came whirring along, and taking up the gauntlet lit close by its supposed rival and fell a victim to the ruse.

"The note used by the native in this instance was a peculiar nasal 'yak-yak-yak-yak.' This was made by placing his hands over his mouth and closing the nose with thumb and finger. At this time the males were continually pursuing each other or holding possession of prominent knolls, frequently rising thence 5 to 10 yards in the air, with quick wing strokes, and descending with stiffened wings with the tips curved downward. While ascending they uttered a series of notes which may be represented by the syllables 'kû-kû-kû-kû,' which is changed as the bird descends to a hard rolling 'kr-r-r-r-,' in a very deep guttural tone, ending as the bird reaches the ground. Frequently a pair would fly at each other full tilt, and a few feathers would be knocked out, the weaker bird quickly taking flight again, while the victor rises, as just described, and utters his loud note of defiance and victory. On other occasions, when the birds are more evenly matched, they fight fiercely until the ground is strewn with feathers.

"By May 24 almost all these birds are paired, but some did not complete their nuptials until the first few days in June. This Grouse takes but a single mate in northern Alaska, and I am informed by the natives of Unalaska that the same is the case with the Rock Grouse found on the Aleutian Islands, nor have I ever known of the Ptarmigan assembling in numbers about any special meeting place to carry on their love affairs; they scatter about as previously mentioned, being seen singly here and there on prominent knolls over the flat country. Early in June, rarely so early as the last of May, the first eggs are laid; by June 20 and 25 the downy young are usually out, and when approached the female crouches close to the ground amongst her brood. When she sees it is impossible to escape notice, she rolls and tumbles away as though mortally injured, and thus tries to lead one from her chicks. The young at the same time try to escape by running away in different directions through the grass. At this season the female and male both moult and assume a plumage which differs considerably. The young are fledged and on the wing at varying dates through July, and are nearly full grown by the 1st to the 10th of August. They are handsome little creatures in brown and yellow down, with a chestnut cap and black lines down the back. A few days after birth the young begin to show traces of the first full plumage upon their breasts. * * *

"In nesting, these birds usually gather a few grasses and dry leaves, and with them they loosely line a shallow depression which is situated on the side of some slight knoll or dry place on the open grass and moss covered tundra."[1]

Mr. L. M. Turner, in his manuscript on the birds of Labrador and Ungava, makes the following statement regarding this species: "In the spring these birds repair, as the snow melts, to the lower grounds and prepare for the nuptial season. About the 10th of April they may be heard croaking or barking on all sides. A male selects a favorable tract of territory for the location of the nest, and endeavors to induce a female to resort to that place. He usually selects the highest portion of the tract, whence he launches into the

[1] Extracts from Report upon Natural History Collections made in Alaska, 1877–1881, Nelson, pp. 132–135.

air uttering a barking sound of nearly a dozen separate notes, thence sails or flutters in a circle to alight at the place whence he started, or to alight on another high place, from which he repeats the act while flying to his former place. Immediately on alighting, he utters a sound similar to the Indian word *chŭ-xwan* (what is it?) and repeats it several times, and in the course of a few minutes again launches in the air. Early in the morning hundreds of these birds may be heard, continuing until near 11 o'clock, when the bird then becomes silent until after 3 o'clock, when he again goes through the same performance, though with less vigor than in the morning. In the course of a few days a female may be found in the vicinity. The actions of the male are now redoubled, and woe be to any bird of his kind which attempts to even cross his chosen locality. Battles ensue which for fierceness are seldom equaled by birds of larger size.

"In the vicinity of Fort Chimo the nesting of this species begins during the latter part of May. The nest is usually placed in a dry spot among the swamps or on the hillsides where straggling bushes grow. The nest is merely a depression in the mosses, and contains a few blades and stalks of grass, together with a few feathers from the parent bird, which is now in the height of the moult from the winter to the summer plumage.

"The first eggs obtained were two, on June 1, 1884, this being the earliest record at Fort Chimo. The number laid for a set varies greatly in different localities. At Fort Chimo, seven to nine is the usual number, although in exceptional instances as many as eleven and rarely thirteen may be found. While I was at St. Michael (Norton Sound, Alaska) I frequently found nests containing as many as fifteen and several times found seventeen. I was there informed that over twenty eggs had been taken from a single nest. On neither side of the continent did I hear that more than one female deposited eggs in the same nest. I can affirm that a clutch of seven eggs may be taken, and, if the nest be not disturbed, the female will deposit nearly the same number again. These may again be taken, and not over three eggs will be deposited, and if disturbed a third time she will lay no more unless she selects a new location, which, of course, would be difficult to ascertain.

"I can not speak accurately on the subject, but think that seventeen days are required to incubate the eggs. On the 20th of June I obtained a young bird of this species, which was less than forty-eight hours out of the shell. This was the earliest record. Thousands of these young must perish annually, either from the cold rains, or from their parents being killed for food. The Indians consider the downy young of the Ptarmigan a special delicacy, even if taken from the shell; the bird serves in lieu of an oyster. I once had occasion to require the services of several Indian women to blow some eggs, which, during a pressure of other work, I had no time to do. I set them to work and frequently went to see if the work was progressing satisfactorily. I observed a pile of birds without, and some with feathers on, lying on a board. I inquired why they were being reserved. An old woman picked up one of

the birds by the leg, and throwing back her head opened her mouth and indicated the purpose plainer than words could tell. After the middle of August the birds have acquired a good size, and are then feeding on berries of various kinds. They then are quite tender, of nearly white flesh, and when properly prepared form a pleasant food for the table. The young birds of the year attain their full growth by the 1st of November."

Mr. R. MacFarlane, chief factor of the Hudson Bay Company, who is exceedingly well qualified to speak about the Willow Ptarmigan, says: "This species is exceedingly abundant in the neighborhood of Fort Anderson, on the Lower Anderson River, and in the wooded country to the eastward. It is not, however, common in the Barren Grounds, especially from Horton River to Franklin Bay, where it is replaced by *L. rupestris*. The nest is invariably on the ground, and consists of a few withered leaves placed in a shallow cavity or depression. The female sometimes leaves it only when almost trodden under foot, in fact several were swooped upon and caught thereon by hand. They usually begin to lay about the end of May or the beginning of June. The process of moulting, or the gradual assumption of their summer plumage, commences a week or two earlier. The female lays from seven to ten, twelve, and occasionally as many as thirteen, eggs, which I find was the greatest number recorded, and we had reason to know that some, at least, of the nests were used by Ptarmigan several seasons in succession. When very closely approached as stated, the female would frequently flutter off, sometimes spreading her wings and ruffling her feathers, as if to attack or frighten away intruders, and at other times calling out in distressed tones, and acting as if she had been severely wounded.

"In one instance where an Indian collector had found a nest which contained seven eggs, he placed a snare thereon; but on returning to the spot a few hours afterwards he was surprised to find that six of the eggs had disappeared in the interim, and as no eggshells were left behind (the male escaped) they were in all probability removed by the parents to a safer position. The male bird is generally not far away from the nest, and his peculiarly hoarse and prolonged note is frequently heard, the more especially between the hours of 10 p. m. and 2 a. m. Both, however, displayed great courage and devotion in protecting from capture their young, which we often encountered on our return coast trips.

"About the end of September, during October, and early in November *L. lagopus* assembles in great flocks, but during the winter it was seldom that more than two or three dozen were ever noticed in single companies. They are, however, most winters very numerous in the neighborhood of Fort Good Hope and other Hudson Bay Company posts in the Mackenzie River district; but as the spring sets in they begin to migrate northward. It is very doubtful if many breed to the south of latitude 68°, at least in the valley of the Anderson."[1]

[1] From R. MacFarlane's Manuscript on Land and Water Birds Nesting in British North America.

The food of the Willow Ptarmigan, during the early spring and summer, consists principally of the buds and tender leaves of the various species of birch and willows found in that region, and several kinds of berries, such as arbutus, cranberry, and whortleberry, as well as insects of different species, of which they find an abundant supply during the short summer season.

All observations made on the habits of the Ptarmigan during the breeding season tend to show that the male is equally devoted, and shows a strong attachment for the young, assisting in taking care of them, and displaying as great a solicitude for their safety as the female, differing in this respect from most of the Grouse family, by whom the care and protection of the young is apparently almost entirely left to their mates.

The nests of the Willow Ptarmigan are, as a rule, not particularly well hidden, and judging from the large number of eggs of this species in the U. S. National Museum collection, procured principally by Mr. R. MacFarlane, of the Hudson Bay Company, near Anderson River Fort, in about latitude 68°, they must be exceedingly abundant at this point.

The average number of eggs to a set is from seven to eleven, and but one brood is raised in a season. The eggs vary in shape from ovate to elongate ovate. The ground color ranges from cream color to a pronounced reddish buff, with several intermediate shades. In some specimens it is very clearly seen, in others it is almost completely obscured by the heavy confluent blotches and markings. The latter vary from well-defined and nearly even-sized spots of different sizes to confluent and clouded blotches, and smears of various shades of dark reddish and clove brown, completely obscuring the ground color in some instances. All this coloring matter can be readily removed in a freshly-laid egg, leaving the shell a pale creamy white, and they show an almost endless variation in shape, color, and size. All the specimens in the U. S. National Museum collection were taken in the month of June, the majority about the middle of this month.

The average measurement of two hundred and fifty specimens in the U. S. National Museum collection is 43 by 31 millimetres. The largest egg of this series measures 47 by 33.5, the smallest 39.5 by 28 millimetres, and a runt specimen 20 by 17.5 millimetres.

The types selected to show the variations in the styles of markings and coloration were obtained as follows: No. 6023 (Pl. 2, Fig. 5), from an incomplete set of three, taken by G. Bannister near Whale River, Ungava Bay, Labrador, June, 1862; No. 9251 (Pl. 2, Fig. 6), from a set of seven, June 29, 1863; No. 10689 (Pl. 2, Fig. 7), from a set of seven, June 20, 1865; all the latter being from the region east of Anderson River Fort, British North America, and collected by R. MacFarlane. No. 16461 (Pl. 2, Fig. 8), from a set of eight, taken June 20, 1872, by W. H. Dall, U. S. Coast Survey, on Popof Island (one of the Shumagin Group), Alaska Peninsula; No. 17042 (Pl. 2, Fig. 9), from a set of six, taken June 3, 1874, near St. Michael, Alaska,

by L. M. Turner, U. S. Signal Service; and No. 21364 (Pl. 2, Fig. 10), from a set of ten, taken June 11, 1880, at St. Michael, Alaska, by E. W. Nelson, U. S. Signal Service.

## 25. Lagopus lagopus alleni Stejneger.

ALLEN'S PTARMIGAN.

*Lagopus alba alleni* Stejneger, Auk, 1, 1884, 369.
*Lagopus lagopus alleni* Stejneger, Proceedings U. S. National Museum, viii, 1885, 20.
(B —, C —, R —, C —, U 301*a*.)

Geographical range: Newfoundland.

According to Dr. L. Stejneger this newly described subspecies is similar to *Lagopus lagopus*, but distinguishable by having the shafts of both primaries and secondaries black, the wing feathers and even some of the coverts marked and mottled with the same color.

Dr. C. Hart Merriam refers to this bird in the Ornithologist and Oölogist (Vol. viii, No. 6, 1883, p. 43) as the Common or Willow Ptarmigan, and says: "It is still an abundant resident in Newfoundland, even in the vicinity of St. Johns, and thousands of them are killed annually on the peninsula of Avalon alone. It frequents rocky barrens, feeding on seeds and berries of the stunted plants that thrive in these exposed situations."

In his notes on the "Zoölogy of Newfoundland," Henry Reeks, esq., F. L. S., makes the following statement, which unquestionably applies to this race: "The Willow Grouse is called 'Partridge' by the settlers, and it frequents beds of alder and dwarf birch in swampy places, especially on the borders of lakes and rivers. It breeds on the ground among stunted black spruce, in rather drier situations."[1]

The breeding range of this well-marked race of the Willow Ptarmigan seems, as far as at present known, to be confined to the island of Newfoundland, where it is a resident. I have been unable to find any description of the eggs, which undoubtedly are indistinguishable from those of *Lagopus lagopus*.

## 26. Lagopus rupestris (Gmelin).

ROCK PTARMIGAN.

*Tetrao rupestris* Gmelin, Systema Naturæ, i, ii, 1788, 751.
*Lagopus rupestris* Leach, Zoölogical Miscellany, ii, 1817, 290.
(B 468, C 387, R 475, C 569, U 302.)

Geographical range: Arctic America in general, southeastward to the Gulf of St. Lawrence (Anticosti), except the northern extremity of the peninsula of Labrador, and region thence northward, Greenland and the Aleutian Islands.

The breeding range of the Rock Ptarmigan extends through Arctic North America, from the Alaska Peninsula and Bering Strait, along the Arctic coast,

[1] Zoölogist, second series, 1869, Vol. iv, p. 1747.

southeast through the Barren Grounds, to the west coast of Hudson Bay, the Northeast Territory, and southern Labrador, and possibly Anticosti Island, in the Gulf of St. Lawrence.

Mr. E. W. Nelson states that "this beautiful Ptarmigan is a common resident of the Alaskan mainland, and unlike the common White Ptarmigan it frequents the summits of the low hills and mountains during the summer season, where it remains until the severe weather of early winter forces it down to the lower elevations and under the shelter of the bush-bordered ravines and furrows marking the slopes."[1]

There is evidently but little difference in the general habits of this species and those of the common Willow Ptarmigan, except that it frequents higher altitudes during the breeding season.

We are indebted to Mr. R. MacFarlane for nearly all we know about the breeding habits, nests, and eggs of this interesting species. He says: "This Ptarmigan is not near so plentiful as *L. lagopus*, and we only met with it in any considerable numbers from Horton River, Barren Grounds, to the shores of Franklin Bay. Very few nests were found to the eastward of that river, or on the coast or 'barrens' of the Lower Anderson. Its nest is similar but it lays fewer eggs than *L. lagopus*, as nine proved to be the rarely attained maximum among an aggregate record of sixty-five nests. The usual number was six or seven, and there were some which held only four and five eggs. It was no easy matter, however, to find the nests of this species, as the plumage of the birds and the color of the eggs both strongly resembled the neighboring vegetation. At the same time the female sat so very closely that more than one was caught on the nest, and I recollect an instance where the female bird, on the very near approach of our party, must have crouched as much as possible in the hope that she might not be noticed, which would have happened had not one of the smartest of our Indian collectors caught a glance of her eye. Although lots of male 'Rockers' were observed on our summer trips, feeding and otherwise disporting themselves in the 'barrens,' yet comparatively few nests were obtained, and, except in 1862, not one well-identified example was discovered west of Horton River, but during the winter scores of *L. rupestris* were met with in the forest country east of Fort Anderson."[2]

The "Barren Grounds," so often referred to in connection with the breeding grounds of numerous birds, are thus described by Mr. R. MacFarlane in a paper entitled, "On an Expedition down the Begh-Ula or Anderson River:" "The belt of timber which at Fort Anderson[3] extends for over 30 miles to the eastward, rapidly narrows and becomes a mere fringe along the Anderson River, and disappears to the northward of the sixty-ninth parallel of latitude. The country is thickly interspersed with sheets of water varying in size from mere small ponds to small and fair sized lakes. In traveling northeast toward

[1] Report on the Natural History Collections made in Alaska 1877–1881, Nelson, p. 136.

[2] From R. MacFarlane's Manuscript on Land and Water Birds Nesting in British North America.

[3] Established on Anderson River in 1861, and abandoned in 1866. Approx. lat. 68° 35′.

Franklin Bay, on the Arctic coast, several dry, swampy, mossy, and peaty plains were passed before reaching the 'Barren Grounds' proper. The country thence to the height of land between the Anderson and the deep gorge-like valley through which the Wilmot Horton River (MacFarlane River of Petitot's map) flows, as well as from the 'crossing' of the latter to the high plateau which forms the western sea-bank of Franklin Bay, consists of vast plains or steppes of a flat or undulating character, diversified by some small lakes and gently sloping eminences, not dissimilar in appearance to portions of the Northwest prairies. In the region here spoken of, however, the ridges occasionally assume a mound-like hilly character, while one or two intersecting affluents of the Wilmot Horton flow through valleys in which a few stunted spruce, birch, and willows appear at intervals. On the banks of one of these, near its mouth, we observed a sheltered grove of spruce and willows of larger growth, wherein moose and musk oxen had frequently browsed. We met with no more spruce, nor any traces of the moose to the eastward, and I doubt if many stragglers range beyond latitude 69° north.

"The greater part of the Barren Grounds is every season covered with short grasses, mosses, and small flowering plants, while patches of sedgy or peaty soil occur at longer or shorter distances. On these, as well as along the smaller rivulets, river and lake banks, Labrador tea, cranberries, and a few other kinds of berries, dwarf birch, willows, etc., grow. Large, flat spaces had the honeycombed appearance usually presented in early spring by land which has been turned over in autumn. There were few signs of vegetation on these, while some sandy and many other spots were virtually sterile. * * * These Barren Grounds are chiefly composed of a peaty, sandy, clayey, or gravelly soil, but stones are rare and rock *in situ* (limestone?) was encountered only two or three times on the line of march from the woods to the coast."[1]

This description will give the reader a good idea of the summer home of the Rock Ptarmigan; and while its food differs probably but slightly from that of the Willow Ptarmigan, it must necessarily be restricted to a much smaller variety. Their nests, usually placed among the dwarf brush or sedge-covered patches of the tundras on these barrens, are much harder to find than those of the latter, and the U. S. National Museum is almost entirely indebted to the indefatigable Mr. R. MacFarlane for the handsome series of eggs of this species in the collection, all of which, with the exception of a single set, were obtained by him.

Nidification begins about the middle of May in Alaska, and correspondingly later in the Barren Grounds, usually from June 15 to July 10. But a single brood is raised in a season. The number of eggs to a set varies from six to ten, rarely more, and usually but seven or eight are laid. These are ovate or short ovate in form, resembling the eggs of *Lagopus lagopus* considerably both in color and markings, but they average smaller. The majority are readily distinguished from those of the latter, the markings as a rule being

[1] Canadian Record of Science, January, 1890, pp. 52, 53.

smaller and better defined, and seldom running into indistinct and irregular blotches as is frequently the case in the eggs of that species.

The ground color ranges from a pale cream to a decided yellowish-buff, and in many specimens this is entirely hidden by a vinaceous rufous suffusion. The spots and blotches range from a dark clove brown to a dark claret red, with paler colored edgings; they are of various sizes, from the size of a buck-shot to that of No. 10 shot, and are irregularly distributed over the egg.

The average measurement of ninety-nine specimens in the U. S. National Museum collection is 42 by 30 millimetres. The largest egg in this series measures 44 by 32.5, the smallest 39 by 29 millimetres.

The types selected to show the different styles of markings are as follows: No. 7642 (Pl. 2, Fig. 11), from an incomplete set of three eggs, taken near Franklin Bay, Arctic coast, June 26, 1883; No. 9268 (Pl. 2, Fig. 12), from a set of eight, taken near Anderson River, Arctic America, June 10, 1863; No. 9273 (Pl. 2, Fig. 13) from an incomplete set of four, same locality, taken July 7, 1863; and No. 9284 (Pl. 2, Fig. 14), from a set of six, same locality, June 3, 1863; all having been collected by Mr. MacFarlane. No. 14997 (Pl. 2, Fig. 15) is from a set of ten eggs, taken in the Gens-du-large or Romanzof Mountains, Alaska, by Mr. James McDougall, of the Hudson Bay Company, in the latter part of May, 1869.

## 27. Lagopus rupestris reinhardti (Brehm).

REINHARDT'S PTARMIGAN.

*Lagopus reinhardi* (err. typ.) Brehm, Lehrbuch europäischer Vögel, 1823, 440.
*Lagopus rupestris reinhardti* Blasius, List European Birds, 1862, 16.
(B —, C —, R —, C —, U 302*a*.)

Geographical range: Greenland, islands on western side of Cumberland Gulf, and northern extremity of Labrador (Ungava).

The breeding range of Reinhardt's Ptarmigan, as known at present, includes both shores of Baffin Bay, Davis Strait, and Hudson Strait, ranging well up into the Arctic circle. It is a common bird in Greenland, and a number of its eggs collected in the vicinity of Sukkertoppen are in the U. S. National Museum collection.

It is not at all rare in the northern portions of Labrador, and Mr. L. M. Turner, of the U. S. Signal Service, makes the following statement regarding this subspecies, in his "Notes on the Birds of Labrador and Ungava:"

"This Ptarmigan is known to the white people as the Rock Grouse, or simply as 'Rocker.' In the southern portion of Labrador these Ptarmigan are not very numerous, but become so as the more northern and elevated portions of the country are reached. They prefer more open ground '*and rarely straggle even into the skirts of the wooded tracts.*' The hilltops and 'barrens' (hence often called Barren Ground Bird) are their favorite resorts. As these tracts are more

extensive in the northern portions of Labrador and Ungava, these birds are there very abundant. During the summer months they are quite scarce in the vicinity of Fort Chimo, retiring to the interior and the hills of George River for that season. In the month of May the nuptial season arrives and is continued until about June, when nesting and laying begin. The birds are by this time scattered, each pair now taking possession of a large tract of stunted vegetation, among which they make their nest and rear their young. I was never able to procure the eggs of this species. Only young birds a few days old were brought to me, and some of larger size.

"As before stated the mating season begins in May, and during this period the male acts in the strangest manner to secure the affection of his chosen mate. He does not launch high in air and croak like the Willow Ptarmigan, but runs around his prospective bride with tail spread, wings either dragging like those of the common Turkey, or else his head and neck stretched out, and breast in contact with the ground, pushing himself in this manner by the feet, which are extended behind. The male at this time ruffles every feather of his body, twists his neck in various positions, and the supraorbital processes are swollen and erect. He utters a most peculiar sound, something like a growling 'kurr-kurr,' and as the passion of the display increases the bird performs the most astonishing antics, such as leaping in the air without effort of wings, rolling over and over, acting withal as if beside himself with ardor.

"The males engage in most desperate battles; the engagement lasts for hours, or until one is utterly exhausted, the feathers of head, neck, and breast strewing the ground. A manœuvre is for the pursued bird to lead the other off a great distance and suddenly fly back to the female, who sits or feeds as unconcerned as it is possible for a bird to do. She acts thoroughly the most heartless coquette, while he is a most passionately devoted lover. He will rather die than forsake her side, and often places himself between the hunter and her, uttering notes of warning for her to escape, while attention is drawn to him, who is the more conspicuous.

"When the young are with the parents they rely upon their color to hide themselves among the nearly similar vegetation from which they procure their food. I am certain I have walked directly over young birds which were well able to fly. If the parent birds are first shot, the entire number of young may be secured, as they will not fly until nearly trodden upon, and then only for a few yards, where they may easily be seen. I have found on two occasions an adult female with a brood of thirteen young. All of the flocks were secured without trouble. At other times only three or four young would be found with both parents. The young are very tender when first hatched; no amount of most careful attention will induce them to eat, and after only a few hours' captivity they die. I could never keep them alive above twelve hours. The changeable weather, sudden squalls of snow or rain, must be the death of scores of these delicate creatures. Their note is a soft piping 'pe-pe-pe,' uttered several times,

and has the same sound as that of the young of the Bob White, *Colinus virginianus*.

"In the young birds just hatched, and up to the age of three weeks, it is difficult, if possible at all, to distinguish them to a certainty from the young of *Lagopus lagopus* of the same age. They are slightly darker, and the lower parts have a greenish tinge to the down instead of yellow, as in the young of *L. lagopus*. Although I have preserved a great number of these young birds I would still hesitate to assert to which of the two species they belong. After the age of three weeks they may be easily distinguished by the bill. By the 10th of August the wing quills have begun to show the winter plumage. The first primary is then white and nearly half its normal length, with the second and third showing considerable development. The bird is at this time about the size of a Bob White (*Colinus virginianus*)."

The food of Reinhardt's Ptarmigan during the summer consists of insects as well as various leaves and berries, such as those of the crowberry (*Empetrum nigrum*), whortleberries, the tender leaves of the dwarf birch and white birch (*Betula alpestris*) as well as the buds, willow buds, and sorrel. Mr. Ludwig Kumlien shot a specimen near Cumberland Sound, whose crop was crammed full of sphagnum moss. They are usually met with in small coveys from six to ten birds, rarely more.

But a single brood is reared in a season. The eggs are usually deposited during the month of June, and the sets vary from six to fourteen, very rarely more. They are absolutely indistinguishable from those of the Rock Ptarmigan *Lagopus rupestris;* in fact, the average measurement of thirty-three specimens in the U. S. National Museum collection, from Greenland, corresponds exactly with that of the preceding species, giving an average of 42 by 30 millimetres. The largest egg of the series measures 44 by 32, the smallest 40 by 29 millimetres. The majority of these eggs were collected near Godthaab and Sukkertoppen, Greenland, and are a gift of Governor E. Fencker.

None are figured, as they are exactly like the eggs of *Lagopus rupestris*.

## 28. Lagopus rupestris nelsoni Stejneger.

NELSON'S PTARMIGAN.

*Lagopus rupestris nelsoni* Stejneger, Auk, I, 1884, 226.
(B —, C —, R —, C —, U 302*b*.)

Geographical range: Island of Unalaska and adjacent islands in the Aleutian Chain.

The types of this comparatively new race were taken by Mr. Nelson, at Unalaska, one of the Aleutian Islands; he reports it as common there, frequenting the mountain tops and slopes, and breeding in June.

Mr. Turner, in his "Contributions to the Natural History of Alaska," refers to this subspecies in his article on *Lagopus rupestris*, from which it had not been separated when his account was written. He says:

"On some of the islands it is extremely abundant, among those may be mentioned Unalaska, Unimak, Akutan, and Akun. It is a resident where found, and, among the islands, rarely leaves its native island. At Unalaska they seem to prefer the high rocky ledges, but everywhere come down to the low narrow valleys to roost and rear their young. They rarely assemble in large flocks; a dozen to twenty individuals usually compose a flock. The season begins in the early part of May, and is continued for about mating three weeks, by which time the site for the nest is chosen, usually amidst the tall grasses at the mouth of a wide valley, or else on the more open tundra among the moss and scanty grass.

"The nest of this bird is composed of a few stalks of grass and the feathers that may fall from the mother's breast. The nest is a very careless affair, and often, near the completion of incubation, the eggs will lie on the bare ground surrounded by a slight circle of grass stalks that have apparently been kicked aside by the mother impatient of her task. The number of eggs varies from nine to seventeen, eleven being the usual number. The exact date of incubation was not determined by me. The young are able to follow the mother as soon as they are hatched.

"As this bird never collects into large flocks, I always supposed the flocks seen in winter were the parents with the brood reared the previous summer."

There are no eggs of Nelson's Ptarmigan in the U. S. National Museum collection, neither have any of the ornithologists, who met with this subspecies, described them. There is every reason to presume, however, that they are indistinguishable from the eggs of the Rock Ptarmigan.

### 29. Lagopus rupestris atkhensis (Turner).

TURNER'S PTARMIGAN.

*Lagopus mutus atkhensis* Turner, Proceedings U. S. National Museum, v, July 29, 1882, 227, 230.

*Lagopus rupestris atkhensis* Nelson, Cruise of the Corwin, 1883, 56*e*+82.
(B—, C—, R—, C—, U 302*c*.)

Geographical range: Atka Island, Aleutian Chain.

Mr. E. W. Nelson states: "Among the specimens secured by Mr. L. M. Turner, during his residence in the Aleutian Islands, are four Ptarmigans, which, upon examination, prove to represent a well-marked geographical race of *L. rupestris*. His specimens were secured June 7 and May 29, upon Atka Island, at the extreme western end of the Aleutian Chain. They are found upon this island, and undoubtedly upon those adjoining. * * * It is undoubtedly to this race that Mr. Dall refers in his 'Contribution to the

Ornithology of the western end of the Aleutian Chain,' when he speaks of finding nine much incubated eggs on June 21, at Attu Island, and chicks which were hatched at Kiska July 8."[1]

Mr. Turner himself writes: "When I first obtained these birds I was struck with the greater size, and also, with the shape of the bill, and greater length of the claws when compared with the mainland bird. This bird frequents the lowlands and hills of the western islands of the Aleutian Chain. They are quite plentiful on Atka, Amchitka, and Attu Islands. The nest is built amongst the rank grasses at the bases of hills and the lowlands near the beach. It is carelessly arranged with a few dried grass stalks and other trash that may be near. The eggs vary from eleven to seventeen, and are darker in color than those of the *L. rupestris* and but slightly inferior in size to those of *L. lagopus*. A number of eggs of this species were procured, but broken in transportation; hence, I can give no measurements of them.

"The general habits of this species are those of the other species. At Attu they frequent the higher elevations, probably on account of the great number of foxes (*Vulpes lagopus* Baird) which occur on that island and have but little to subsist on. The natives of Attu assert that this species of Ptarmigan occurs on Agattu Island, and that it is quite numerous there, probably on account of the absence of foxes."[2]

Nothing further is known of the nesting habits of Turner's Ptarmigan, and no specimens of their eggs have as yet found their way into the U. S. National Museum collection.

## 30. Lagopus welchi Brewster.

WELCH'S PTARMIGAN.

*Lagopus welchi* Brewster, Auk, II, April, 1885, 194.
(B —, C —, R —, C —, U 303.)

Geographical range: Newfoundland.

This newly described species is based on specimens obtained during May and June, 1883, by Mr. George O. Welch, in whose honor it has been named.

Mr. Brewster states: "The colors in the male of this Ptarmigan are confused and blended to such a degree that a detailed description, however carefully drawn, fails to do them justice. The general effect is that of a dark, grayish-plumbeous bird (colored not unlike the Oregon form of the Dusky Grouse), plentifully besprinkled with fine dots of pepper-and-salt color. * * *

"According to Mr. Welch these Ptarmigan are numerous in Newfoundland, where they are strictly confined to the bleak sides and summits of rocky hills and mountains in the interior. Unlike the Willow Grouse of that island, which in winter wander long distances and frequently cross the Gulf to Lab-

[1] Report on the Natural History Collections made in Alaska 1877–1881, Nelson, p. 139.
[2] Contributions to the Natural History of Alaska, 1886, Turner, p. 156.

rador, the Rock Ptarmigan are very local, and for the most part spend their lives on or near the hills where they are reared."[1]

In his notes on the "Zoölogy of Newfoundland," in the Zoölogist (second series, 1869, Vol. IV, p. 1747), Henry Reeks, esq., refers to the present species, under the name of Rock Ptarmigan, as follows: "A truly Alpine species in Newfoundland; rarely found below the line of stunted black spruce, except in the depths of winter, when they descend to the lowlands and feed on the buds of dwarf trees, sometimes in company with the Willow Grouse; but I never saw this species perch on trees. It is called by the settlers the 'Mountain Partridge.'"

The nest and eggs of this species have not as yet, so far as I am aware, been described, but are presumably similar to those of *Lagopus rupestris*.

### 31. Lagopus leucurus Swainson.

WHITE-TAILED PTARMIGAN.

*Lagopus leucurus* Swainson, Fauna Boreali Americana, II, 1831, Pl. 63.
(B 469, C 388, R 476, C 570, U 304.)

Geographical range: Alpine summits of Rocky Mountains; south to New Mexico; north into British America (as far as Fort Halkett, Liard River); west to higher ranges of Oregon, Washington, and British Columbia.

The breeding range of the White-tailed Ptarmigan, within the United States at least, is only found on or near the summits of the higher mountain ranges, and apparently always above timber line. It extends from Alaska southward through western North America, reaching its most southerly point in northern New Mexico (vicinity of Taos), where Dr. B. J. D. Irwin, U. S. Army, obtained specimens near Cantonment Burgwyn. It has also been met with in eastern Idaho, Montana, Wyoming and Colorado, where, in suitable localities, it is by no means rare.

On the Pacific coast it is reported common in the mountains of British Columbia and the Olympic and Cascade Ranges in Washington, especially on Mounts Baker, Ranier, and St. Helen's. In Oregon it is reported from Mounts Hood and Jefferson, and, according to Indian testimony, it occurs as far south as Diamond Peak, 60 miles north of Fort Klamath, Oregon. I know of no record, however, that this species has actually been taken in Oregon. The Washington records are given on the authority of Prof. O. B. Johnson, of Washington University, Seattle, Washington, as well as of other correspondents.

Mr. W. M. Wolfe, of Kearney, Nebraska, writes me of having found the White-tailed Ptarmigan in the Wind River Mountains, Wyoming, and in the Bitter Root Mountains of Idaho and Montana.

It is a resident and breeds wherever found, rarely leaving the mountain summits, even during the severest winter weather, and then only descending

[1] Brewster, Auk, II, April, 1885, pp. 194, 195.

2,000 or 3,000 feet at most, seldom being found at a lower altitude than 8,000 or 9,000 feet at any time. In the Rocky Mountain region it is generally known by the very appropriate name of the "White" or "Snow" Quail.

Mr. George Bird Grinnell has kindly furnished me the following information about this species: "I have found the White-tailed Ptarmigan in considerable numbers in Colorado, Montana, and British Columbia. Where I have seen them they have always been above timber line. Although on a few occasions I have met with these birds in the late summer when the young were little more than half grown and the broods were still together, my experience with them has been chiefly in the autumn when hunting mountain sheep and white goats high up among the summits of the ranges. At this season of the year they are usually found in small numbers, from two to a half dozen being the ordinary size of the flocks. Last year, however (October, 1889), I came across a pack of these birds in the Cascade Mountains of British Columbia, where there were twenty-five or thirty together. In the autumn the birds are generally rather wild, and if nearly approached become quite uneasy and run about, holding the tail elevated and looking very much like a white Fan-tail Pigeon. At this season the only cry that I have heard is a sharp cackle like that of a frightened hen. This the bird begins to utter a short time before it takes wing, and continues it for quite a little while after having begun to fly.

"On the high plateaus where this bird is found the wind often blows with a tremendous sweep and is almost strong enough to throw down a man. When such a wind is blowing the Ptarmigan dig out for themselves little nests or hollows in the snow banks, in which they lie with their heads toward the wind and quite protected from it.

"Often on the rocky slopes where there is no snow they may be seen lying crouched on the ground behind rocks or small stones, with their heads directed to the quarter from which the wind blows. If startled from such a place they all take wing at once, looking like a flock of white Pigeons, and fly for a short distance, but as soon as they touch the ground again they throw themselves flat on it behind the most convenient shelter. Among the high mountains of the St. Mary's Lake region in Montana I have seen birds of this species which were pure white by the 20th of September. On the other hand, in the Cascade region of British Columbia, they have still a good many brown spots in early October. I presume the change of plumage varies with the locality and often with the individual bird."

Mr. A. W. Anthony writes me as follows: "In southern Colorado, where I have met with this species, nesting must begin some time from the first to the middle of June, as I have found young birds but an hour or so from the egg, from July 1 to the 18th. The nests I have seen were located in the loose rocky débris of steep hillsides, a simple depression in the short fine grass which grows in small patches between the rocks above the timber line

Although utterly devoid of protection from bush or shrub, so nearly does the sitting bird resemble the gray bowlders which surround her on every side that the discovery of the nest is due largely to accident. When incubating it is nearly impossible to flush the bird, according to my experience. Twice have I escaped stepping upon a sitting Ptarmigan by only an inch or so, and once I reined in my horse at a time when another step would have crushed out the life of a brood of nine chicks but an hour or so from the egg. In this case the parent crouched at the horse's feet, and, though in momentary danger of being stepped on, made no attempt to escape until I had dismounted and put out my hand to catch her. She then fluttered to the top of a rock a few feet distant, and watched me as I handled the young, constantly uttering low anxious protests. The chicks were still too young to escape, mere little awkward bunches of down that stumbled and fell over one another when they attempted to run.

"Miners in whom I place confidence have told me that they have lifted sitting Ptarmigan from the nest and handled the eggs, while the bird stood but a few feet distant watching her treasures and uttering an occasional squeak like a sitting hen. One, which had her nest near the trail between the cabin and the mine, was annoyed in this way so often that she would attempt to regain the nest while the eggs were being handled, and had to be frequently pushed aside; she never failed to peck at the hand and utter her protesting 'k-r-rrr' whenever any one attempted to touch her, and made no attempt to fly away.

"I have never heard of a nest at a lower elevation than one I found in Saguache County, Colorado, which was not over 200 feet above timber line. I think that they usually nest above 12,000 feet. Judging from the broods of young I have flushed in August, I consider nine about the average number."

Mr. Drew, in his field notes on the Birds of San Juan County, Colorado, makes the following statement about this species: "Very common; breeds. They are found above timber line in summer, where they feed on the leaves and flowers of the marsh marigold, *Caltha leptosepala.* * * * They are usually quiet during the day, but active and noisy in the evening, making a cackling like Prairie Chickens. * * * They have from eight to ten young at a brood."[1]

Mr. Dennis Gale writes me as follows: "Irrespective of season, as a general rule, a single bird will not flush unless urged to it. During the summer months this is especially noticeable; they will only move out of your way when directly in your path, and close upon them, by short tacks right and left, sidling off from you, at each tack changing sides, moving quickest on the short run just before slowing up for the turn. Two or more together are much more likely to flush, and if alarmed while flying will utter a quick repeated 'köck, köck,' very like the note uttered by *Pediocætes phasianellus campestris* under similar circumstances.

[1] Bulletin Nuttall Ornithological Club, Vol. VI, 1881, p. 141.

"As near as I can decide, they nest about the middle of June and hatch out their young about the middle of July. It is very rarely that a female is seen from the beginning of June until noticed in company with her brood. At this season I have frequently met with the males singly, and sometimes as many as five together; and I do not think that they take any share in the duties of incubation.

"I met with two broods, one with, I think, seven chicks just hatched out, and the other of five, nearly two weeks old. The latter showed no white; they had, in both cases, a general gray appearance; the newly hatched brood was in the downy phase. There was a disposition, clearly proven with the chicks of both broods, to hide when the hen signaled danger; but some of the older ones flushed and flew at least 50 yards. The females were very tame and would not flush; in fact they could not be induced by mild treatment to leave the place where the young had hidden. They walked around me so close that I could have touched them with my hand, and showed a marked concern for the safety of their broods, clucking in a manner very similar to our domestic hen. I am of the opinion that this species is very much less numerous now than they were ten years ago, and I believe the conditions generally favor a yearly contraction in their numbers; at least this will be the case wherever their summer range is available for stock to graze over."

The crop of a bird of this species, kindly sent me by Mr. Gale for examination as to the nature of its food, was filled with the buds and catkins of a species of birch, *Betula glandulosa*.

The number of eggs to a set are variously stated at from four to fifteen. From eight to ten may be considered a fair average. Notwithstanding the fact that the nests of the White-tailed Ptarmigan are said to have been found repeatedly, but very few of the eggs of this species have as yet found their way into collections. The U. S. National Museum has an incomplete set of four, taken by Mr. A. D. Wilson, one of the chiefs of the Hayden Geological Survey, in the San Juan Mountains, southern Colorado, at an altitude of 12,300 feet. He told me that he accidentally stumbled on the nest, while crossing a rocky mesa, on the morning of July 15, 1875. The nest was placed between a couple of lichen-covered rocks, and contained, if he remembered rightly, five or six nearly fresh eggs. The female skulked off as he was in the act of stepping over her, and hid amongst the rocks some 20 feet away.

Dr. Elliott Coues, in an article "On the breeding habits, nest, and eggs of the White-tailed Ptarmigan," describes this nest as follows: "The nest in its present state measures scarcely 5 inches in diameter by about an inch in depth. It thus seems rather small for the size of the bird, but is probably somewhat compressed in transportation. The shape is saucer-like, but with very litle concavity of surface. The bottom is decidedly and regularly convex in all directions, apparently fitting a considerable depression in the ground. The outline is to all intents circular. The nest is rather closely matted, the material interlacing it in all directions, and retains considerable consistency.

The material is chiefly fine dried-grass stems; with these are mixed, however, a few small leaves and weed tops and quite a number of feathers. The latter, evidently those of the parent birds, are imbedded throughout the substance of the nest, though more numerous upon its surface, where a dozen or so are deposited; there may have been some loose ones lost in handling."[1]

A set of these rare eggs has recently been obtained by Mr. Thomas H. Jackson, of West Chester, Pennsylvania, who kindly allowed me to examine it, and placed all the information regarding it at my disposal. This set, containing but four eggs, in which incubation had already begun, was taken by Mr. Evan Lewis, in the vicinity of the Chicago Lakes, in Clear Creek County, Colorado, on June 19, 1890, at an altitude of about 12,200 feet. The nest itself was but a slight hollow in the ground, lined with a few small twigs, blades of grass, and a few feathers. It was about such a nest as a Bantam hen would make.

Mr. Lewis says: "The bird did not leave the nest until I stepped within a foot of it; then she strutted around, dragging her wings, very much like a Turkey does. When I returned to get the eggs, she allowed me to stroke her with my hand, and was about as tame as an average hen is when sitting. Foxes are very numerous around here, so that I did not dare to leave the eggs to see if others would be laid. I saw several of these birds, both males and females, the latter always between 3 and 5 o'clock p. m. The location of this nest, just above timber line, on the level top of a ridge, near isolated patches of dwarf willows, made me think they always nested in such places; but one sitting bird I saw feeding started up the mountain, running a short distance, then flew about a thousand feet, and after resting a few seconds repeated its flight and disappeared over the top of the mountain.

"I met a covey of young Ptarmigan about July 17, 1886, near the top of the mountain, at an altitude of about 13,000 feet. They were not very shy, and my companion and I counted them. I am not quite positive as to the number, but am under the impression there were nine or fifteen. I judged them to be nearly two weeks old. I ran after one, which tried to creep under a large rock, and I readily caught it. The old bird flew around my head and came close enough to knock my hat off, and as soon as we were about 100 feet away she began to call her flock together. I never saw more than two adult birds together, and should two males meet they immediately commence fighting, till one finally drives the other away."

The shape of the White-tailed Ptarmigan's eggs is an elliptical ovate. Their ground color varies from a creamy buff to a pale reddish or salmon buff. The markings are few, generally small in size and well defined. Some eggs, however, are much more heavily spotted than others, and in these the markings are more irregular and in the shape of blotches. These markings vary from reddish brown to chocolate brown.

[1] Bulletin U. S. Geological Surveys of the Territories, 2d series, v, 1875, p. 3.

Compared with other eggs of the Grouse family, they resemble far more the eggs of *Dendragapus* than *Lagopus*. None of the markings run into each other, as is often the case in eggs of the different species of *Lagopus*, and they are not nearly so heavily spotted. As in all Grouse eggs, these markings are entirely superficial. The three perfect specimens in the U. S. National Museum collection measure 43 by 30, 42.5 by 29, and 44 by 30 millimetres. Mr. Jackson's specimens are a trifle larger, and measure 46 by 30.5, 44.5 by 30.5, 44 by 31, and 44 by 30.5 millimetres.

The type specimen, No. 17200 (Pl. 2, Fig. 16), from an incomplete set, was collected by Mr. A. D. Wilson, of the Hayden Geological Survey, on July 15, 1875, in the San Juan Mountains, southern Colorado; the second (Pl. 2, Fig. 17), from a set of four, now in Mr. Thomas H. Jackson's collection, and kindly loaned for figuring, was taken June 19, 1890, in Clear Creek County, Colorado, by Mr. Evan Lewis.

## 32. Tympanuchus americanus (Reichenbach).

PRAIRIE HEN.

*Cupidonia americanus* Reichenbach, Systema Avium, 1852, p. xxix; based on Vollst. Naturg. Hühnen., Pl. 217, Figs. 1896–1898.
*Tympanuchus cupido americanus* Ridgway, Manuscript.
(B 464, C 384, R 477, C 563, U 305.)

Geographical range: Prairies of Mississippi Valley; south to Louisiana and Texas; west to northern Indian Territory, middle Kansas, Nebraska, and eastern North and South Dakota; east to Kentucky, Indiana, northwestern Ohio, southeastern Michigan, and southwestern Ontario, Canada; north to southern Manitoba.

The breeding range of the Pinnated Grouse or Prairie Hen extends over the prairie country of the Mississippi Valley, from southeastern Texas and Louisiana; north to Manitoba to about latitude 50°, vicinity of Winnipeg; east to western Ontario, Canada, southeastern Michigan (Monroe County), and northwestern Ohio, where they are rare now—a few still exist in Kentucky; west, they range to eastern North and South Dakota, throughout Nebraska, eastern and central Kansas, and the northern portion of the Indian Territory; south, at least to Fort Reno. They are not uncommon in suitable localities in northwestern Indiana, central Illinois, Missouri, and Wisconsin, and very abundant in Iowa, Minnesota, eastern Kansas, Nebraska, and the eastern portion of the two Dakotas. The range of this species is rapidly contracting along its eastern border, and equally rapidly extending both north and westward, where it is following the settlements. It is partly migratory in the northern portions, and resident from the central portions of its range south.

Mr. W. W. Cooke writes on this subject as follows: "The Prairie Chicken is commonly said to be a resident bird, and so it is in the larger part of its range, but in Iowa a regular though local migration takes place. This has been men-

tioned by former writers, and in the spring of 1884 a special study was made of the matter. Many observers unite in testifying to the facts in the case, and what is still more important, there is not a dissenting voice. One of the observers does not exaggerate when he says: 'Prairie Chickens migrate as regularly as a Canada Goose.' Summing up all the information received, the facts of the case are as follows: In November and December large flocks of Prairie Chickens come from northern Iowa and southern Minnesota to settle for the winter in northern Missouri and southern Iowa. This migration varies in bulk with the severity of the winter. During an early cold snap immense flocks come from the northern prairies to southern Iowa, while in mild, open winters the migration is much less pronounced. During a cold wet spring the northward movement in March and April is largely arrested on the arrival of the flocks in northern Iowa, but an early spring, with fair weather, finds them abundant in the southern tier of counties in Minnesota, and many flocks pass still further north. The most remarkable feature of this movement is found in the *sex* of the migrants. It is the females that migrate, leaving the males to brave the winter's cold. Mr. Miller, of Heron Lake, Minnesota, fairly states the case when he says: 'The females in this latitude migrate south in the fall and come back in the spring, about one or two days after the first Ducks; and they keep coming in flocks of from ten to thirty for about three days, all flying north. The Grouse that stay all winter are males."[1]

The mating season begins early, about the beginning of March, and the packs sometimes commence to break up while the ground is still covered with snow.

Judge John Dean Caton describes the love-making of the male Pinnated Grouse as follows: "The spring of the year is the season of courtship with them, and it does not last all the year round as it does with humans, and they do it in rather a loud way, too; and instead of taking the evening, as many people are inclined to do, they choose the early morning. Early in the morning you may see them assemble in parties, from a dozen to fifty together, on some high dry knolls, where the grass is short, and their goings on would make you laugh. The cock birds have a loose patch of naked yellow skin on each side of the neck just below the head, and above these on either side, just where the head joins the neck, are a few long black feathers, which ordinarily lay backward on the neck, but which, when excited, they can pitch straight forward. Those yellow naked patches on either side of the neck cover sacs which they can blow up like a bladder whenever they choose. These are their ornaments, which they display to the best advantage before the gentler sex at these love feasts. This they do by blowing up these air sacs till they look like two ripe oranges, on each side of the neck, projecting their long black ears right forward, ruffling up all the feathers of the body till they stand out straight, and dropping their wings to the ground like a Turkey cock. Now they look just lovely, as the coy

[1] Bulletin II, Dept. of Agriculture, Report on Bird Migration in the Mississippi Valley, 1888, p. 105.

timid maidens seem to say, as they cast side glances at them, full of admiration and of love.

"Then it is that the proud cock, in order to complete his triumph, will rush forward at his best speed for two or three rods through the midst of the love-sick damsels, pouring out as he goes a booming noise, almost a hoarse roar, only more subdued, which may be heard for at least 2 miles in the still morning air. This heavy booming sound is by no means harsh or unpleasant; on the contrary, it is soft and even harmonious. When standing in the open prairie at early dawn listening to hundreds of different voices, pitched on different keys, coming from every direction and from various distances, the listener is rather soothed than excited. If this sound is heavier than the deep key notes of a large organ, it is much softer, though vastly more powerful, and may be heard at a much greater distance. One who has heard such a concert can never after mistake or forget it.

"Every few minutes this display is repeated. I have seen not only one, but more than twenty cocks going through this funny operation at once, but then they seem careful not to run against each other, for they have not yet got to the fighting point. After a little while the lady birds begin to show an interest in the proceedings by moving about quickly a few yards at a time, and then standing still a short time. When these actions are continued by a large number of birds at a time, it presents a funny sight, and you can easily think they are moving to the measure of music.

"The party breaks up when the sun is half an hour high, to be repeated the next morning and every morning for a week or two before all make satisfactory matches. It is toward the latter part of the love season that the fighting takes place among the cocks, probably by two who have fallen in love with the same sweetheart, whose modesty prevents her from selecting between them."[1]

Nesting follows quickly after the birds are once paired, but as a rule they seem to show very poor judgment in the selection of the sites. Immense numbers of nests are annually destroyed, either by fire in dry seasons or water during wet ones, not taking the many other enemies into consideration at all, and it is safe to compute the loss of eggs alone, from the first two mentioned causes, at 50 per cent. Many nests with eggs are also yearly plowed up.

On the prairies they generally select unburnt places to nest in, where the old grass is thick; others prefer the borders of large marshes, where, during a wet season, they are almost certain to be destroyed by water. The nest is simply a slight excavation, alongside of some slough, in a fence corner among tall grass or a clump of weeds, or in cultivated fields or meadows, and again on open prairies, where the grass is very short. If there is plenty of material at hand the nest is often quite thickly lined, but on burned prairie very little lining is used, as no effort is made by the hen to bring material from a distance. Apparently no particular attempt is made to conceal the nest; the bird sits so

[1] Forest and Stream, March 29, 1883, p. 165.

close and harmonizes so well with the surroundings that she often escapes observation when in plain view.

Asst. Surg. J. C. Merrill, U. S. Army, found a nest of the Prairie Hen about half a mile from Fort Reno, Indian Territory, on May 20, 1890, which he describes as follows: "The nest was placed in a tussock of tall prairie grass growing on sloping ground on the open prairie. It was composed of dried grass blades, well matted together, and a few feathers from the parent. The nest was open on the northeast side of the tussock, and directly opposite was a narrow opening, or rather a tunnel, through the grass. On the two occasions upon which the bird was flushed from the nest she sat with her head toward this tunnel, through which she left the nest and skulked off. The eggs, fourteen in number, were found in one layer, and arranged without system, the smaller ends pointing in all directions. Incubation was far advanced."

This set and the female thereof are now in the U. S. National Museum collection.

Laying begins in the southern portions of its range sometimes as early as the latter part of March, and further north fully a month to six weeks later. Next to the Bob White I consider the Pinnated Grouse one of the most prolific of our game birds, laying from eleven to fourteen eggs on an average to a set; sets of twenty and more eggs have been repeatedly found and are not especially rare. Mr. Horace A. Kline, of Vesta, Johnson County, Nebraska, reports in the Ornithologist and Oölogist (August, 1882, p. 150), "that during this year he had seen two nests containing twenty-one eggs each," and gives the average of a large number examined as fourteen. He also states that "one of the most destructive agents to the nests of these valuable birds is the prairie fire. Many of the stockmen do not burn their hay ground until the middle of May, and so thousands of eggs are destroyed every year. In passing over one of these burned fields I counted five nests containing seventy-eight eggs on about one acre of ground."

Now and then a nest of this species is found above ground. Probably the bird had lost her first brood and learned wisdom from her former experience. Mr. P. H. Smith, jr., writes me that he found a nest of this species near Greenville, Bond County, Illinois, containing five eggs, on the top of an old hay-stack, 6 feet from the ground.

Mr. J. W. Preston, of Baxter, Iowa, informs me that a number of years ago he frightened a Prairie Hen from her nest of eggs in a marsh that was subject to overflow; the nest was entirely submerged and the bird was incubating the cold eggs. Not eight feet distant, on a tussock, a Marsh Harrier was caring for her clutch of eggs. Strange neighbors!

As a rule but one brood is raised in a season, but occasionally nests with fresh eggs are found in July and even in August, which seems to indicate that now and then a second brood may be reared; if this is actually the case, it is exceptional, unless the first eggs have been destroyed.

Incubation lasts from three to four weeks. The male does not assist in this duty, but keeps to himself. The young leave the nest as soon as hatched, and are cared for by the female alone. Their food at first consists almost, if not entirely, of insects, and when grasshoppers are plenty, as they frequently are in the northern parts of their breeding range, they subsist almost exclusively on them. Later they frequent the grain fields and feed on the different cereals as well as other small seeds and berries. The female is much devoted to her young, and will act similarly to the Ruffed Grouse in trying to attract the attention of the intruder to herself and away from the chicks, which hide quickly in the grass at the first intimation of danger which the parent may give.

By the latter part of August most of the broods are well grown and able to care for themselves. Two or three coveys pack together then, and later in the fall packs numbering fully five hundred and more may be seen where these birds are common.

The eggs of the Prairie Hen, as previously stated, number on an average from eleven to fourteen to a set, and if the first clutch is destroyed, which is unfortunately too often the case, a second and smaller set is laid. The color of the eggs varies from pale cream to vinaceous and olive buff, as well as light brown and clay color. Scarcely two sets are alike in this respect.

The majority of the eggs of this species in the U. S. National Museum collection, are faintly but regularly spotted with fine pin points of reddish brown, in some instances scarcely perceptible to the naked eye. In a few sets in the series the markings show plainly, but none are larger than a No. 6 shot, and but few that size. The spots are pretty regular in size, and well defined, even when very small.

The eggs are ovate; a few short-ovate in shape. The average size is 43 by 32.5 millimetres. The largest egg in one hundred and two specimens measures 46 by 34, the smallest 40 by 30 millimetres. A runt egg of this species in the collection measures but 18 by 15 millimetres.

The type specimen (No. 3103), from a set of eleven eggs (Pl. 2, Fig. 18), was collected by J. W. Tolman, near Winnebago, Illinois, May, 1860. No. 14517, from a set of sixteen eggs (Pl. 2, Fig. 19), was collected by G. and C. Blackburn, in Buchanan County, Iowa, May 22, 1868. This is the heaviest marked set in the series. No. 21102, from a set of eleven (Pl. 2, Fig. 20), collected for myself by Capt. B. F. Goss, Pewaukee, Wisconsin, May 20, 1876, is one of the darkest sets in the series.

## 33. Tympanuchus cupido (Linnæus).

HEATH HEN.

*Tetrao cupido* Linnæus, Systema Naturæ, ed. 10, I, 1758, 160.
*Tympanuchus cupido* Ridgway, Proceedings U. S. National Museum, VIII, 1885, 355.
(B 464, part; C 384, part; R 477, part; C 563, part; U 306.)

Geographical range: Island of Martha's Vineyard, Massachusetts.

The breeding range of the Heath Hen is, at present, limited to the island of Martha's Vineyard, Massachusetts, where these birds are strictly protected.

Mr. William Brewster says: "They were formerly found at various points in eastern Massachusetts, southern Connecticut, Long Island, New Jersey, and Pennsylvania; perhaps also southern New England, and the Middle States generally. A *woodland* species, inhabiting scrubby tracts of oak and pine. * * * The general differences between this bird and its Western representative, *T. americanus*, are difficult of adequate definition, for the reason that they consist largely in shades of color rather than in markings. Its small size, short tarsus, acutely lance-pointed feathers of the neck-tufts, white-tipped scapulars, general reddish coloration above and restricted light markings beneath, are, however, readily appreciable and apparently constant characters. * * *

"The Heath Hen (I use the vernacular name by which it was known to our forefathers) is still common on Martha's Vineyard, where it is mainly, if not exclusively, confined to the woods, haunting oak scrub by preference and feeding largely on acorns. Being strictly protected by law, but few are probably killed. I am told by one of the Boston marketmen, however, that he has had as many as twenty from the Vineyard in a single season. He also says that they average nearly a pound less in weight than Western specimens, and on this account do not sell as readily.

"The bird is not found on the neighboring island of Naushon, despite statements by recent writers to that effect, nor is there any good evidence that it ever occurred there. There is also no reason to believe that the stock on Martha's Vineyard has been vitiated by the introduction of Western birds. It is simply the last remnant of a once more or less widely distributed race, preserved in this limited area partly by accident, partly by care. According to the best testimony available the colony is in no present danger of extinction."[1]

From a more recent article on this species published by Mr. Brewster, based on information gathered by him during a visit to Martha's Vineyard in July, 1890, I extract the following: "Throughout Martha's Vineyard the Heath Hen (locally pronounced hêth'n, as this Grouse is universally called) is well known to almost every one. Even in such seaport towns as Cottage City and Edgartown most of the people have at least heard of it, and in

[1]Auk, Vol. II, 1885, pp. 82–84.

the thinly settled interior it is frequently seen in the roads or along the edges of the cover by the farmers, or started in the depths of the woods by the hounds of the rabbit and fox hunters.

"Its range extends, practically, over the entire wooded portion of the island, but the bird is not found regularly or at all numerously outside an area of about 40 square miles. This area comprises most of the elevated central portions of the island, although it also touches the sea at not a few points on the north and south shores. In places it rolls into great rounded hills and long irregular ridges, over which are scattered stretches of second-growth woods, often miles in extent, and composed chiefly of scarlet, black, white, and post oaks from 15 to 40 feet in height. Here and there, where the valleys spread out broad and level, are fields which were cleared by the early settlers more than a hundred years ago, and which still retain sufficient fertility to yield very good crops of English hay, corn, potatoes, and other vegetables. Again, this undulating surface gives way to wide, level, sandy plains, covered with a growth of bear, chinquapin, and post-oak scrub, from knee to waist high, so stiff and matted as to be almost impenetrable; or to rocky pastures, dotted with thickets of sweet fern, bayberry, huckleberry, dwarf sumac, and other low-growing shrubs.

"Clear, rapid trout brooks wind their way to the sea through open meadows, or long narrow swamps wooded with red maples, black alders, high huckleberry bushes, andromeda, and poison dogwood, and overrun with tangled skeins of green briars.

"At all seasons the Heath Hens live almost exclusively in the oak woods, where the acorns furnish them abundant food, although, like our Ruffed Grouse, they occasionally at early morning and just after sunset venture out a little way in the open to pick up scattered grains of corn or to pluck a few clover leaves, of which they are extremely fond. They also wander to some extent over the scrub-oak plains, especially when blueberries are ripe and abundant. In winter, during long-continued snows, they sometimes approach buildings, to feed upon the grain which the farmers throw out to them. A man living near West Tisbury told me that last winter a flock visited his barn at about the same hour each day. One cold snowy morning he counted sixteen perched in a row on the top rail of a fence near the barnyard. It is unusual to see so many together now, the number in a covey rarely exceeding six or eight, but in former times packs containing from one to two hundred birds each were occasionally met with late in the autumn.

"Only one person of the many whom I questioned on the subject had ever seen a Heath Hen's nest. It was in oak woods, among sprouts at the base of a large stump, and contained either twelve or thirteen eggs. The date, he thought, was about June 10. This seemed late, but I have a set of six eggs taken on the Vineyard July 24, 1885, and on July 19, 1890, I met a blueberry picker who only the day before had started a brood of six young, less than half grown. These facts prove that this bird is habitually a late breeder.

"The farmers about Tisbury say that in spring the male Heath Hen makes a booming or tooting noise. This, according to their descriptions must resemble the love notes of the Western Pinnated Grouse. About sunrise, on warm still mornings in May, several birds may be sometimes heard at once, apparently answering one another.

"During my stay at Martha's Vineyard, I obtained as many estimates as possible of the number of Heath Hens which are believed to exist there at the present time. My most trustworthy informants were, creditably, averse to what was apparently mere idle guessing; but when I questioned them, first as to the extent of the region over which the birds ranged, and next as to how many on the average could be found in a square mile within this region, they answered readily enough, and even with some positiveness. As already stated the total present range of the Heath Hen covers about 40 square miles. The estimates of the average number of birds per mile varied from three to five, giving from one hundred and twenty to two hundred birds for the total number. These estimates, it should be stated, relate to the number of birds believed to have been left over from last winter. If these breed freely and at all successfully, there should be a total of fully five hundred, young and old together, at the beginning of the present autumn. When one considers the limited area to which these birds are confined, it is evident that within this area they must be reasonably abundant. I was assured that with the aid of a good dog it was not at all difficult to start twenty-five or thirty in a day, and on one occasion eight were killed by two guns. This, however, can be done only by those familiar with the country and the habits of the birds."[1]

The only eggs of the Heath Hen in any collection, as far as known to me, are the set of six referred to above in Mr. Brewster's article, and now in his cabinet. These were taken July 24, 1885, at Martha's Vineyard, Massachusetts, and brought unblown to C. J. Maynard, from whom they were procured. They contained large embryos, and were saved with considerable difficulty.

The specimen figured (No. 23945, U. S. National Museum collection, Pl. 3, Fig. 2) is one of these eggs. It is creamy buff in color, with a slight greenish tint, ovate in form, and unspotted. It measures 44 by 33 millimetres.

[1] Forest and Stream, September 25, 1890.

## 34. Tympanuchus pallidicinctus (Ridgway).

LESSER PRAIRIE HEN.

*Cupidonia cupido* var. *pallidicincta* Ridgway, Bulletin Essex Institute, v, December, 1873, 199.

*Tympanuchus pallidicinctus* Ridgway, Proceedings U. S. National Museum, viii, 1885, 355.

(B —, C 384*a*, R 477*a*, C 564, U 307.)

Geographical range: Southwestern parts of Kansas and western Indian Territory, western (and southern?) Texas.

The breeding range of the Lesser Prairie Hen, a smaller, paler-colored species than *T. americanus*, is not as well known as could be desired, and as far as our present knowledge goes includes southwestern Kansas, the western parts of Indian Territory as well as portions of northwestern and perhaps southern Texas. The latter locality is based on the statement of Asst. Surg. James C. Merrill, U. S. Army, who says, in his Notes on the Ornithology of Southern Texas (pp. 159, 160): "I am informed by a person perfectly familiar with the bird that the Prairie Chicken is occasionally seen on the prairies of Miradores ranch, which is about 30 miles north of the fort (referring to Fort Brown, Texas), and a few miles from the coast. This is probably about the southernmost point in the range of this bird." This statement is further confirmed by Lieut. Col. Lawrence S. Babbitt, U. S. Ordnance Corps, who writes me under date of March 18, 1890, as follows: "The Prairie Hen is not found in the immediate vicinity of San Antonio, Texas, but exists in great numbers south and southeast and in limited numbers north and west from here, all at about an average distance of 100 miles from the above mentioned locality."

It is possible, however, that this species may only be a winter resident in southern Texas. Mr. William Lloyd, in his Notes on the Birds of Western Texas, states: "*Tympanuchus pallidicinctus*. Lesser Prairie Hen. Winter visitor; seen in October and November in Concho County and also in winter on Middle Concho in Tom Green County. Abundant near Colorado City on the Texas and Pacific Railroad. I believe this record extends the range to the southwest. Westward it was abundant to the foothills of the Davis Mountains. Said to have been driven from the Pan Handle counties by the numerous prairie fires."[1]

The nesting habits of this species are undoubtedly similar in every respect to those of *Tympanuchus americanus*. Mr. C. S. McCarthy found it breeding abundantly 40 miles west of Fort Cobb, in the Indian Territory, he taking not less than three nests with eggs on June 1, 1860. Presumably but one brood is raised in a season. The number of eggs to a set is probably about the same as that of the previously mentioned species. The three sets in the

[1] Auk, Vol. iv, 1887, p. 187.

U. S. National Museum collection, contain seven eggs each, and are probably incomplete. They are somewhat lighter colored than the eggs of the common Prairie Hen and almost unmarked, but this is perhaps not constant. Their shape is ovate.

The ground color varies from pale creamy white to buff. The markings, which are all very fine, not larger than pin-points, are lavender colored. More than two-thirds of the eggs are unspotted, and all look so till closely examined. In size they average a trifle smaller than the eggs of the Prairie Hen. The mean measurement of twenty-two specimens in the U. S. National Museum collection is 42 by 32.5 millimetres. The largest egg measures 43.5 by 33.5, the smallest 41 by 31 millimetres.

The type specimen, No. 4011 (Pl. 3, Fig. 1), was obtained June 1, 1860, 40 miles west of Fort Cobb, Indian Territory, by C. S. McCarthy. This set contained seven eggs.

## 35. Pediocætes phasianellus (Linnæus).

SHARP-TAILED GROUSE.

*Tetrao phasianellus* Linnæus, Systema Naturæ, ed. 10, I, 1758, 160.
*Pediocætes phasianellus* Elliot, Proceedings Academy Natural Sciences, Phila., 1862, 403 (*nec* Baird, 1858, qui subsp. *columbianus*).
(B —, C 383, R 478, C 561, U 308.)

Geographical range: Interior of British America, east of Rocky Mountains, about James Bay (Moose Factory), and the western shore of Hudson Bay, northern Manitoba; north at least to Fort Simpson, Mackenzie River, Northwest Territory.

The breeding range of the Sharp-tailed Grouse extends from about latitude 52° north, and westward through British America to the eastern slopes of the Rocky Mountains, as far north as latitude 69°, and probably still farther within the Arctic circle. Mr. C. P. Gaudet, of the Hudson Bay Company, found it breeding in latitude 68°, near Fort Good Hope, in the Mackenzie River Basin. Its northeastern range is not well defined, but it probably reaches the northern shores of Hudson Bay, and breeds possibly as far south as Moose Factory, James Bay, about latitude 51°, 40′. It seems to be especially abundant in the vicinity of Great Slave Lake, between latitude 61° and 63°; most of the eggs in the U. S. National Museum collection coming either from Forts Rae, Providence, or Resolution, all three posts situated on different parts of this lake.

Comparatively little is as yet known about the breeding habits of this subspecies. There is no reason to suppose, however, that they differ materially from those of its more southern relatives, which will be fully described. The Sharp-tailed Grouse is said to inhabit the wooded districts of the fur countries, as well as the borders of the extensive prairies or tundras near the numerous lakes found throughout that region, and it is probably more or less migratory in the winter.

But a single brood is raised in a season. Nidification begins, sometimes at least, extremely early with this species, eggs having been found May 1, 1863, by Mr. L. Clarke, of the Hudson Bay Company, at Fort Rae, in latitude 63°. These must have been laid long before the ice and snow disappeared from the surrounding country. Mr. R. MacFarlane also took a nest containing nine eggs, on May 15, 1884, near Fort Providence. According to this gentleman, the Sharp-tailed Grouse breeds also in the pine forests on both sides of the Lockhart and Upper Anderson Rivers, where one or two nests were taken, but the eggs were afterward lost.

The number of eggs to a set varies from seven to fourteen, and their ground color from a fawn color with a vinaceous rufous bloom, to chocolate, tawny, and olive brown in different specimens. The majority of the eggs are finely marked with small, well-defined spots of reddish brown and lavender, resembling the markings found on the eggs of *Tympanuchus americanus*, only they are much more distinct. Compared with the eggs of the two southern subspecies *P. phasianellus columbianus* and *P. phasianellus campestris*, they usually are very much darker colored, even the palest specimens being darker than the heaviest marked eggs of either of the two subspecies. These markings are entirely superficial, and when removed leave the shell a creamy white in some cases and a very pale green in others. In shape they are usually ovate. The average measurement of thirty-four eggs in the U. S. National Museum collection is 44.5 by 32 millimetres. The largest egg of this series measures 48 by 33, the smallest 42 by 30 millimetres.

Of the type specimens selected to show the variations, No. 7619 (Pl. 3, Fig. 3), from an incomplete set of seven, was obtained May 10, 1863, near Fort Rae, Great Slave Lake, by Mr. L. Clarke, jr., of the Hudson Bay Company; No. 7620 (Pl. 3, Fig. 4), from an incomplete set of six, taken June 1, 1863, by the same gentleman, in the same locality; and No. 22503 (Pl. 3, Fig. 5), a single egg, taken May 16, 1885, near Fort Providence, Great Slave Lake, was obtained from Mr. R. MacFarlane, also of the Hudson Bay Company.

## 36. Pediocætes phasianellus columbianus (Ord).

COLUMBIAN SHARP-TAILED GROUSE.

*Phasianus columbianus* Ord, Guthrie's Geography, 2d Am. ed., II, 1815, 317.
*Pediœcetes phasianellus* var. *columbianus* Coues, Key to North American Birds, 1872, 234.

(B 463, C 383*a*, R 478*a*, C 562, U 308*a*.)

Geographical range: Northwestern United States; south to northeastern California, northern Nevada, and Utah; east to Montana and Wyoming; west to Oregon and Washington; north, chiefly west of Rocky Mountains, through British Columbia, to central Alaska (Fort Yukon).

The Columbian Sharp-tailed Grouse inhabits the grass-covered plains of the Northwest. Its breeding range extends from eastern Montana and Wyoming, westward through northern and central Utah, the whole of Idaho, eastern

and central Oregon and Washington, south to northern Nevada and northeastern California, along the eastern slopes of the Siskiyou Mountains. The latter, as well as the eastern spurs of the Cascades, forms a barrier to its westward extension in Oregon and Washington, and it is here, at Fort Klamath, Oregon, that this bird reaches the most westerly point of its range. North it is found throughout eastern British Columbia, on both sides of the Rocky Mountains, and it has been taken as far north as Fort Yukon, Alaska.

The habits of the Columbian Sharp-tailed Grouse, also known as the Spike-tail and the Prairie Chicken, are very similar to those of its eastern relative, *P. phasianellus campestris*. It is one of the most abundant and best known game birds of the Northwest, inhabiting the prairie country to be found along the foothills of the numerous mountain chains intersecting its range; seldom venturing into the wooded portions for any distance, and then only during the winter months, when it is partially migratory in certain sections.

According to my own experience the Columbian Sharp-tail breeds more frequently on the sheltered and sunny slopes of the grass-covered foothills of the mountains than in the lower valleys and creek bottoms. At Fort Lapwai, Idaho, this Grouse was exceedingly common about twenty years ago, but it is much less so now. It then gathered into large packs during the late fall and winter, frequently numbering two hundred and more. These kept together until about the beginning of March, when they commenced to break up. The "dancing" indulged in during the mating season, and which will be fully described in the succeeding article, began at Fort Lapwai (the only place where I had the opportunity of witnessing it) usually between the 1st and 10th of March, and by the end of that month most of the birds were paired and had selected their nesting sites. Nidification began usually from about April 15, to May 1, according to the season. I found a set of fifteen eggs, which had been sat upon about a week or ten days, on April 22, 1871. Some birds must have laid earlier still, as it was no uncommon sight to find fully grown birds by July 10. All the nests of this species which I examined were invariably well concealed and rather difficult to find. You might search daily for a couple of weeks and be unsuccessful in finding a nest, and again you might stumble on two or three on the same day. A bunch-grass covered hillside, with a southerly exposure, seemed to be a favorite nesting site with this Grouse at Fort Lapwai, while at Camp Harney, Oregon, they confined themselves during the breeding season to the sage brush covered plains of the Harney Valley, interspersed here and there with a low grassy swale, nesting along the borders of these, where the grass attained a heavier growth.

The nest, like that of all the Grouse, is always placed on the ground, usually close alongside some tall bunch of coarse grass, which hides it completely from view. Even if it did not, the female harmonizes in color so thoroughly with her surroundings that she is not apt to be noticed, unless she should leave her nest, which she does not do very readily, as she is

a very close sitter. A slight hollow, usually scratched out on the upper side of a bunch of grass, if the nest is placed on a hillside, is fairly lined with dry grass, of which there is ordinarily an abundance to be found in the vicinity, and this constitutes the nest. A few feathers from the lower parts of the bird are usually mixed in among the eggs, each one of which is often imbedded about two-thirds in its own mould and does not touch the others. Once only did I find the eggs placed on top of each other, eight in the lower and five in the upper layer.

Incubation lasts about twenty-one days, the female attending to this duty exclusively, the males keeping by themselves, usually in small parties of from three to five, frequenting the higher hills and edges of the table lands in the vicinity of the nests. I do not believe that this Grouse is polygamous.

At Camp Harney I have found eggs of this subspecies as late as June 18, and as a rule they nested fully from four to six weeks later there than at Fort Lapwai. The female is exceedingly devoted to her young brood, and I have seen one boldly attack my dog, who accidentally happened to run into a young covey about a week old, while I was riding along one of the tributaries of Lapwai Creek, in the latter part of May, 1871.

But one brood is raised in a season. The young are active, handsome little creatures, and able to use their legs at once on leaving the shell. They are at first fed mostly on insects, young grasshoppers and crickets forming the principal portion of their bill of fare. The former are always abundant and easily obtained; later, when the young are able to fly, the mother leads them to the creek bottoms, where they find an abundance of berries and browse. They are especially fond of the seeds of the wild sunflower, which grows very abundantly in some places, and when these are ripe, many of these birds can be found in the vicinity where these plants grow.

The habits of the Columbian Sharp-tailed Grouse vary very materially in different portions of the country where I have met with them. At Fort Klamath, Oregon, where they are rather rare, I have found them inhabiting decidedly marshy and swampy country, and keeping close to, if not in the edges of, the pine timber throughout the year. At Fort Custer, Montana, this Grouse, during the winter, was much more arboreal than terrestrial in its habits, moving around on the limbs of the large cottonwood trees as unconcernedly as on the ground; spending in this way almost all their time, except when feeding. At Harney, Oregon, and Lapwai, Idaho, they might be frequently seen in small trees and bushes which grow along the creeks, but scarcely ever in large trees, of which there was an abundance. Here, they uttered very few notes at any time, while at Fort Custer I have frequently heard them cackling in the tall cottonwoods which grew along the Big Horn River bottom, before I had approached within several hundred yards of them, evidently giving notice to other birds in the vicinity of my coming.

This fine game bird is decreasing very rapidly throughout its range. It does not seem to prosper in the vicinity of man, and as the country is be-

coming more and more settled, it recedes before civilization. As it is not a particularly shy bird, it falls an easy victim to the gunner.

In Oregon, Washington, and Idaho, where it used to be exceedingly abundant a decade ago, it is every year becoming rarer, and at the present rate of decrease it will not be long before it will be numbered among the game birds of the past, at least in all fertile portions of the country, retaining only a precarious foothold in the more sterile sections of these States where the lands are too poor and rocky to be successfully cultivated.

From eleven to fourteen eggs are laid to each set, rarely more. These are usually short ovate in shape, and very small for the size of the bird. The ground color varies from creamy buff to pale olive brown. An occasional specimen has a pale vinaceous bloom overlying the ground color. The majority of the eggs are slightly spotted with reddish brown; the markings, for the most part, are very fine, the spots varying from mere pin points to the size of No. 6 shot. All these markings are superficial and easily rubbed off on a freshly laid specimen.

The average measurement of seventy-two specimens in the U. S. National Museum collection is 43 by 32 millimetres. The largest egg in this series measures 46.5 by 34.5, the smallest 39 by 31 millimetres.

Of the types, No. 9139 (Pl. 3, Fig. 6), from an incomplete set of four, was collected May 29, 1862, near Fort Yukon, Alaska, by Mr. J. Lockhart, of the Hudson Bay Company; No. 21103 (Pl. 3, Fig. 7), selected from a set of fifteen, was taken April 22, 1871, near Fort Lapwai, Idaho; and No. 21106 (Pl. 3. Fig. 8), from a set of eleven eggs, taken June 18, 1876, near Camp Harney, Oregon. The last two are from the Bendire collection.

## 37. Pediocætes phasianellus campestris Ridgway.

PRAIRIE SHARP-TAILED GROUSE.

*Pediœcetes phasianellus campestris* Ridgway, Proceedings Biological Society, Washington, II, April 10, 1884, 93.
(B —, C —, R —, C —, U 308*b*.)

Geographical range: Plains and prairies of the United States; north to Manitoba; east to Wisconsin and northern Illinois; west to eastern Colorado; south to eastern New Mexico.

This recently described subspecies differs from *Pediocætes phasianellus columbianus* in its rather lighter and much more ochraceous coloration above, in having the black bars narrower and less regular, and in the V-shaped markings of the lower parts being much less distinct. It is thus described by Mr. R. Ridgway, and from types coming from Illinois and the Rosebud River, Montana.

The breeding range of the Prairie Sharp-tailed Grouse extends from northern Illinois, west through southern Wisconsin, northwestern Iowa, middle and western Kansas, through eastern Colorado to northeastern New

Mexico, north through western Nebraska, eastern Wyoming, eastern Montana, Minnesota, and the two Dakotas, and extending north of our border into southeastern Assiniboia and southern Manitoba. Specimens taken along the southern portions of these provinces are typical *P. phasianellus campestris;* and those from middle Manitoba northward to about latitude 52° are intermediate between this and *P. phasianellus.*

The eastern range of this Grouse is becoming rapidly restricted. In Illinois they are very rarely found now. Col. N. S. Goss reports them as becoming rare in Kansas; and the case is the same in Wisconsin and Iowa. Mr. Denis Gale writes: "The Prairie Sharp-tailed Grouse was quite plentiful fifteen years ago on the plains about Denver, Colorado. They are seldom met with now; the last I saw was in the winter of 1886. In 1885, I met one of these birds far up in the foothills at an elevation of over 8,000 feet. Unlike the Prairie Hen, *Tympanuchus americanus*, grain and corn fields have but few attractions for these birds; this, and the stamping out by cattle of the whole country's surface, supplemented by the pot hunter's shotgun to secure a toothsome morsel in and out of season, no doubt accounts for their present scarcity."

Mr. W. M. Wolfe, of Kearney, Nebraska, says: "The Prairie Sharp-tailed Grouse, *P. phasianellus campestris*, was formerly abundant in central Nebraska. Now it has retired before civilization, and the Pinnated Grouse has taken its place. Cold winters, notably that of 1885, drive it back into thinly settled regions. In northwestern Nebraska, where both species are still found, they not infrequently mingle in winter, but are bitter enemies in warm weather. Then they have no occasion to be together, for the Sharp-tailed Grouse always prefers its natural food, tender twigs and insects, while the Pinnated Grouse must have grain. A Sharp-tail never loves a wheat field so well as when there is an abundance of grasshoppers to be found there."

Mr. George Bird Grinnell has kindly furnished me some notes on the habits of the Sharp-tailed Grouse, which are mostly referable to this race. He writes me as follows: "The Sharp-tailed Grouse, which, in certain sections, is called "Speckled Belly" and "Willow" Grouse, I have found in various years almost everywhere west of the Mississippi River, east of the Sierra Nevadas, and north of the Platte River. In the old days it used to be very common all along the Platte and the Loup Rivers in Nebraska, and in the country which lies between these two streams. I have also found it nearly as abundant in the mountains, sometimes even late in the autumn, coming upon single birds or a considerable brood, far up toward the edge of timber in the most narrow wooded ravines. This species is partly migratory, and there is the very greatest difference in the habits of the bird in summer and winter. As soon as the first hard frosts come in the autumn the birds seem to take to the timber, and begin to feed on the buds of the willow and the quaking aspen. At this time they spend a large portion of their time in the trees, and are very wild. In the Shirley Basin, in western Wyoming, a locality where I

have never seen any of these birds in summer, they are abundant in winter. At this season they live in quaking aspen thickets along the mountains, and there I have seen hundreds of them roosting on top of a big barn which stands just at edge of a grove of quaking aspen timber. It was always easy in the morning, just after sunrise, to step out of the house, and, with a .22-caliber rifle, shoot off the heads of as many of these birds as were needed for eating for the next two or three days.

"I have only one note on these birds which seems particularly worth mentioning, and of this I spoke in my report to Col. William Ludlow, on the birds noticed during a reconnoissance to the Black Hills of Dakota, in 1874, which was published by the Engineer Bureau of the War Department. The Sharp-tailed Grouse has a cry which is unlike that of any other Grouse with which I am familiar, although something very similar has been observed in the case, I think, of one of the Ptarmigans. On the plains of Dakota, in 1874, having scattered a brood of Sharp-tailed Grouse, consisting of a mother and a dozen well-grown young, I sat down to wait for them to get together. The mother had flown to the top of a hill not far off, where she sat on the ground in plain sight, and after a few moments began to call to the young, which immediately answered her from the different points where they had taken refuge. The call of the mother and the young was a guttural, raucous croak, which quite closely resembled the croaking of a raven at a little distance. I plainly saw the old bird utter its note, and subsequently followed up the calls uttered by more than one of the young ones, until I started them and killed one or two as they flew. I do not know that this cry of the Sharp-tailed Grouse has been noted by any other observer."

Mr. Ernest E. Thompson has also kindly placed some of his notes on this race, made in southern Manitoba, at my disposal, and I make the following extracts from them: "The Sharp-tailed Grouse, while eminently a prairie bird in the summer time, usually retires to the woods and sandhills on the approach of winter, but in the spring, before the snow is gone, they again perform a partial migration and scatter over the prairies, where alone they are to be found during the summer. They are very shy at all times, but during the winter the comparatively heedless individuals have been so thoroughly weeded out by their numerous enemies, that it requires no slight amount of stalking to get within the range of a flock in the springtime.

"The advent of the Grouse on the still snow-covered plains might prove premature, but that they find a good friend in the wild prairie rose (*Rosa blanda*), which is abundant everywhere; and the ruddy hips, unlike most fruits, do not fall when ripe, but continue to hang on the stiff stems until they are dislodged by the coming of the next season's crop. On the 'Big Plain' stones of any kind are unknown, and in nearly all parts of Manitoba gravel is unattainable during the winter, so that the Sharp-tails and other birds, that require these aids to digestion, would be at a loss, were it not that the friendly rose also supplies this need; for the hips, besides being sweet and nutritious, contain

a number of small angular hard seeds which answer perfectly the purpose of the gravel.

"To illustrate the importance of this shrub in this regard, I append a table of observations on the contents of crops and gizzards of Grouse killed during the various months as indicated:

*January*—Rose-hips, browse, and *Esquisetum* tops.
*February*—Rose-hips and browse.
*March*—Rose-hips and browse.
*April*—Rose-hips and browse of birch and willow.
*May*—Rose-hips and sand-flowers (*Anemone patens*).
*June*—Rose-hips, grass, grasshoppers, and *Proconia costalis*.
*July*—Rose-hips, seeds of star-grass, and *P. costalis*.
*August*—Rose-hips, grass, strawberries, and *P. costalis*.
*September*—Rose-hips, grass, berries, and *P. costalis*.
*October*—Rose-hips, grass, and various berries.
*November*—Rose-hips, birch and willow browse, and berries of arbutus.
*December*—Rose-hips, juniper berries, and browse.

"This is of course a mere list of staples, as in reality nothing of the nature of grain, fruit, leaves, or insects comes amiss to this nearly omnivorous bird, but it illustrates the importance of the rose-hips, which are always obtainable, as they grow everywhere, and do not fall when ripe. In the course of my experience I have examined some hundreds of gizzards of the Prairie Chicken, and do not recollect ever finding one devoid of the stony seeds of the wild rose.

"After the disappearance of the snow, and the coming of warmer weather, the chickens meet every morning at gray dawn in companies of from six to twenty, on some selected hillock or knoll, and indulge in what is called 'the dance.' This performance I have often watched, and it presents the most amusing spectacle I have yet witnessed in bird life. At first the birds may be seen standing about in ordinary attitudes, when suddenly one of them lowers its head, spreads out its wings nearly horizontally and its tail perpendicularly, distends its air sacs and erects its feathers, then rushes across the 'floor,' taking the shortest of steps, but stamping its feet so hard and rapidly, that the sound is like that of a kettledrum; at the same time it utters a sort of bubbling crow, which seems to come from the air sacs, beats the air with its wings and vibrates its tail, so that it produces a loud, rustling noise, and thus contrives at once to make as extraordinary a spectacle of itself as possible. As soon as one commences, all join in, rattling, stamping, drumming, crowing, and dancing together furiously; louder and louder the noise, faster and faster the dance becomes, until at last as they madly whirl about, the birds leap over each other in their excitement. After a brief spell the energy of the dancers begins to abate, and shortly afterward they cease, and stand or move about very quietly, until they are again started by one of their number leading off.

"The whole performance reminds one so strongly of a 'Cree dance' as to suggest the possibility of its being the prototype of the Indian exercise. The

space occupied by the dancers is from 50 to 100 feet across, and as it is returned to year after year, the grass is usually worn off, and the ground trampled down hard and smooth. The 'dancing' is indulged in at any time of the morning or evening in May, but it is usually at its height before sunrise. Its erotic character can hardly be questioned, but I can not fix its place or value in the nuptial ceremonies. The fact that I have several times noticed the birds join for a brief 'set-to' in the late fall, merely emphasizes its parallelism to the drumming and strutting of the Ruffed Grouse, as well as the singing of small birds.

"The whole affair bears a close resemblance to the manœuvring of the European Ruff, and from this and other reasons I am inclined to suspect the Sharp-tail of polygamy. When the birds are disturbed on the hill they immediately take wing and scatter, uttering as they rise their ordinary alarm note, a peculiar vibratory 'cack, cack, cack.' This is almost always uttered simultaneously with the beating of the wings, and so rarely, except under these circumstances, that at first I supposed it was caused by the wings alone, but since then I have heard the sound both when the birds were sailing and when they were on the ground, besides seeing them fly off silently. They have also a call, a soft, clear whistle of three slurred notes, *E*, *A*, *D*, and a sort of grunt of alarm, which is joined in by the pack as they fly off. Their mode of flight is to flap and sail by turns every 40 or 50 yards, and so rapid and strong are they on the wing that I have seen a chicken save itself by its swiftness from the first swoop of a Peregrine Falcon, while another was seen to escape by flight from a Snowy Owl.

"The nest of this subspecies is placed in the long rank grass, under some tuft that will aid in its concealment, and is usually not far from a tract of brush land or other cover. It is little more than a slight hollow in the ground, arched over by the grass. The eggs, usually fourteen, but sometimes fifteen or sixteen, in number, are very small for the size of the bird. Immediately before expulsion they are of a delicate bluish green; on being laid they show a purplish, grape-like bloom; after a few days they become deep chocolate brown, with a few dark spots. After a fortnight has transpired they are usually of a dirty white. This change is partly due to bleaching and also to the scratching they receive from the mother's bill and feet.

"Incubation lasts about twenty-one days. The young when first hatched are covered with golden yellow down, and are spotted with black above. This covering assists them materially in hiding when they squat in the grass. At the age of six weeks they are fully feathered, and at two months fully grown. Although still under guidance of the mother at this time, there are usually not more than six or seven young ones left out of the original average brood of fourteen, which shows the number of chicks which fall a prey to their natural enemies, while many sets of eggs also are destroyed by the fires which annually devastate the prairies. As the fall advances,

they gather more and more into flocks and become regular visitors to the stubble fields, and in consequence regular articles of diet with the farmer."

The nesting habits are similar to those of the Columbian Sharp-tailed Grouse, and the average number of eggs about the same, from eleven to fourteen. Their favorite nesting sites, according to Mr. W. M. Wolfe, are usually along upland thickets or the edges of timber, near streams, and he also states that occasionally two broods are raised in a season. He found one nest on the bare ground under the shelter of a rock.

Dr. T. E. Wilcox, assistant surgeon, U. S. Army, writes me from Fort Niobrara, Nebraska: "In the spring of 1889 a nest of this species was found, and the bird was incubating. Neatly coiled among the eggs was a fox blacksnake, *Coluber vulpinus*, the death of which, perhaps, insured a successful result of the effort to rear offspring. Here they nest usually in the sand-hills, remote from water. Wild grapes, rose-hips, plums, sand-cherries, besides grasses, the tops of plants, grasshoppers, and other insects afford them food."

The nesting season varies according to latitude. In the more southern portions of its range it begins in April, usually about the latter half of this month, and it is protracted to the middle of June occasionally, in the more northern localities.

Incubation lasts about three weeks, and usually but a single brood is raised. The eggs, in shape and color, are exact counterparts of those of the Columbian Sharp-tailed Grouse. They can not be distinguished from each other with certainty. The average measurement of thirty-eight specimens in the U. S. National Museum collection is 42.5 by 31.5 millimetres. The largest egg measures 46 by 32.5, the smallest 40 by 30.5 millimetres.

The type specimen, No. 16645 (Pl. 3, Fig. 9), selected from an incomplete set of three eggs, was taken by Dr. Elliott Coues, near Pembina, North Dakota, June 6, 1873; No. 22829 (Pl. 3, Fig. 10), from a partial set of nine eggs, was collected by Mr. Ernest E. Thompson, in May, 1886, near Carberry, Manitoba.

## 38. Centrocercus urophasianus (Bonaparte).

SAGE GROUSE.

*Tetrao urophasianus* Bonaparte, Zoölogical Journal, III, 1827, 213.
*Centrocercus urophasianus* Swainson, Fauna Boreali Americana, II, 1831, 497, Pl. 58.
(B 462, C 382, R 479, C 560, U 309.)

Geographical range: Sagebrush-covered plains of the interior, principally within the United States from North Dakota, and southern Assiniboia to Washington, and casually(?) to southern British Columbia; south to northern New Mexico, Utah, and Nevada; west to Oregon and California; east to Colorado, Nebraska, South and North Dakota.

The home of the Sage Grouse is found on the dry sagebrush-covered plains and table lands of the western parts of the United States. Its breeding range extends northward to our boundary, latitude 49°, from western

North Dakota, through Montana, Idaho, and Washington, to the eastern slopes of the Cascade Range, thence south through that portion of Oregon east of the Cascades, northeastern California east of the Sierra Nevada, through Nevada, Utah, Colorado, and northwestern New Mexico; thence eastward again through western Nebraska, Wyoming, and western South Dakota. According to Prof. J. Macoun, it is not rare on some of the tributaries of the Upper Missouri in southern Assiniboia, about 30 miles north of the boundary.

The Sage Grouse, next to the Wild Turkey, is the largest of the game birds found within the limits of the United States, full-grown males attaining not infrequently a weight of 8 pounds. The female is much smaller, rarely weighing more than 5 pounds. This species usually is a resident throughout the year wherever found, but in portions of its range is partly migratory. This has been questioned by some writers, but I have positive proof that in the upper Sylvies Valley, in the Blue Mountains of Oregon, where they breed very abundantly at an altitude of from 6,000 to 6,500 feet, every bird leaves the region at the approach of winter, migrating to the lower Harney Valley, and remaining there until the return of spring. The reason for this migration is easily explained. During the winter these birds feed almost entirely on the leaves of the sage (*Artemisia*), which usually grows to the height of 2 or 3 feet in some of the richer valley lands. In the upper Sylvies Valley the snow generally covers these sage bushes entirely, even during a comparatively mild winter, hence their principal food supply is cut off, and the birds are necessarily compelled to migrate in order to find something to eat. During the greater portion of the year their food is much more varied than is generally supposed, but the leaves of the sage are always more or less used at all seasons. From personal observation I know that the seed tops of various grasses and leguminous plants, as well as berries of different kinds, grasshoppers, and crickets (*Anabus simplex*), are consumed to a considerable extent during the summer months.

Capt. William L. Carpenter, Ninth Infantry, U. S. Army, writes me on this subject as follows: "The Sage Grouse does not feed on the *Artemisia* as exclusively as reported, only resorting to this diet, which renders it so objectionable for the table, in the season when nothing else is obtainable. In summer, its principal food (in Wyoming and Colorado) is the leaves, blossoms, and pods of the different species of plants belonging to the genus *Astragalus*, and *Vicia*, commonly called wild pease, which are always eagerly sought for and consumed in great quantities. At this season dissection has shown me also grasshoppers, crickets, and a few of the smaller beetles."

Mr. Robert S. Williams, Great Falls, Montana, states: "I think these birds are seldom seen far from *Artemisia* tracts; but once I scared up a flock of six or eight in the middle of a mountain meadow, among tall grass. I obtained one of the birds, and its crop was filled with the blossoms of a species of golden-rod (*Solidago rigida?*)."

Mr. George H. Wyman makes the following statement in Forest and Stream, August 29, 1889: "The Sage Cock will eat the leaves from sage-brush when it cannot get berries or grain, but it will go farther for a morning feed from a wheat field than any bird I know, except the Wild Goose. I have killed Sage Fowl with stomachs filled with ripe wheat picked up the same morning, in places where none was to be had nearer than 8 miles, and in fact with no cultivation of any kind nearer in any direction. They fly long distances in search of food, but return to roost in the same place at night, generally on some steep hillside, free from shrubs or high grass."

From the foregoing statements it will be seen that the food of the Sage Grouse, during the summer months at least, is quite varied. The fact that the stomachs of these birds are soft, and unlike, in this respect, that of all gallinaceous birds, is well known. No doubt on this account it feeds mostly on leaves and the tender tops of various plants, as well as insects; still there is no reason to doubt that where grain is obtainable, which is not often the case where these birds are found, it will also resort to it as an article of food.

It is a hardy bird, taking kindly to the higher altitudes in the mountain parks, as well as to the hottest and most barren portions of the alkali-covered valleys, as long as they support a scanty growth of *Artemisia*, which seems to be a positive necessity to the existence of this Grouse.

Mr. A. C. Lowell, of Fort Bidwell, California, writes me that "Sage Fowl are much more numerous with us some years than in others, and I believe this bird is a victim of a grub which I have several times found in the walls of the abdominal cavity. These grubs are about $1\frac{1}{4}$ inches long, flat, with a head much broader than its body; they look like the large white worms which are often found cutting shallow paths under the bark of decaying logs."

The mating season begins early in March, and sometimes even in the latter part of February, in fact long before the snow has disappeared. While not at any time what might be called a graceful bird when on the ground, the Sage Cock, during this season, when actively engaged in his courtship, is unquestionably the most comical-looking bird I have ever seen, and it would be hard to say what he most resembles.

Directly west, and about half a mile from Camp Harney, Oregon, on a rocky table land, sparsely covered with stunted patches of sage, a number of these birds wintered regularly, and early one morning in the first week of March, 1877, I had the long-wished-for opportunity to observe the actions of a single cock while paying court to several females near him; and I presume he did his very best. His large, pale yellow air sacs were fully inflated, and not only expanded forward, but apparently upward as well, rising at least an inch above his head, which, consequently, was scarcely noticeable, giving the bird an exceedingly peculiar appearance. He looked decidedly top-heavy and ready to topple over at the slightest provocation. The few long, spiny feathers along the edges of the air sacs stood stood straight out, and the grayish white of the upper parts showed in strong contrast with the black of the breast.

His tail was spread out fan-like, at right angles from the body, and was moved from side to side with a slow quivering movement. The wings were trailing on the ground. While in this position he moved around with short, stately, and hesitating steps, slowly and gingerly, evidently highly satisfied with his performance, uttering, at the same time, low, grunting, guttural sounds, somewhat similar to the purring of a cat when pleased, only louder. This was kept up for some ten minutes. After having regained his usual attitude it was hard to believe that this was the same bird I had seen but a few minutes before.

During the winter the birds pack, and I have more than once seen from fifty to a hundred together. By the 10th of March they are already pretty well scattered, and many are paired by this time. In the vicinity of Camp Harney nidification usually begins about the middle of April. I have found a full set of nine slightly incubated eggs of this species on April 7, 1877, and the first egg must have been laid before March 25. Fresh specimens were also taken by me as late as June 2, probably a second laying, the first having been destroyed. But one brood is raised in a season.

The nest is always placed on the ground, in a slight depression, usually under the shelter of a small sage bush. I have found several, however, some little distance from sage brush flats, alongside and sheltered by a bunch of tall rye grass (*Elymus condensatus?*), near the borders of small creeks. The nest is usually very poorly lined, and in fact the eggs frequently lay on the bare ground without any lining whatever, and are often found in quite exposed situations. I found such a one on May 11, 1875. My notes read as follows: "I stumbled accidentally on this nest. It was placed within a yard of a much-used Indian trail, in a very exposed position, so much so that I saw the eggs while still 5 yards off. There really was no nest, simply a mere depression scratched out by the bird on the south side of a very small sage bush, which afforded no concealment or protection from rain whatever. The bush itself was not over a foot and a half high, growing on a rocky plateau about 3 miles east of Camp Harney. A few feathers were scattered among the eggs which laid on the bare ground, and were separated from each other by bits of grass and dry leaves of the sage. One of the eggs was nearly covered with dirt and almost buried out of sight. The set contained eight eggs, and these were nearly hatched. They were cold when found, and the nest had evidently been abandoned for some days."

As a rule the Sage Hen is a very close sitter, and is loath to leave her nest at any time. I have almost stepped on them before they would quit their eggs.

Capt. William L. Carpenter, U. S. Army, writes me: "I found a nest at Fort Bridger, Wyoming, where this species is numerous, June 1, with nine fresh eggs. I was standing alongside a sage bush watching butterflies; several times looking down carelessly without seeing anything unusal, when happening again to glance at the foot of the bush, in the very place before observed, I saw the winking of an eye. Looking more intently a grayish

mass was discerned blending perfectly with the color of the bush, which outlined itself into the form of a Sage Hen not 2 feet from my foot. She certainly would have been overlooked had not the movement of her eyelids attracted my attention. I stood there fully five minutes admiring the beautiful bird, which could have been caught in my butterfly net, then walked back and forth, and finally passed around the bush to observe it from behind. Not until then did it become frightened and fly away with a loud cackling. The nest was a depression at the foot of a sage bush, lined with dead grass and sage leaves. The spot was marked and visited several times, always passing within a few feet without alarming the bird."

Incubation, I think, lasts about twenty-two days. The males take no part whatever in this duty, and keep to themselves till the young are grown. Many attain their full growth by the 1st of August. Young Sage Fowls are excellently flavored, superior in my opinion to either the Sooty Grouse or the Columbian Sharp-tailed Grouse, always provided that they are drawn at once after being shot. The female is devoted to her young, and will protect them at the risk of her life. They are very expert at hiding themselves, in the manner of young Ruffed Grouse.

Mr. William G. Smith writes me as follows: "While collecting in Carbon County, Wyoming, I caught six young Sage Chickens, probably about four days old, on June 10. The female flew at my legs, and followed me 200 yards to where my wagon was standing, constantly making hostile demonstrations, while the young kept calling."

Their ordinary alarm note, uttered usually only when about to take wing, is a sort of cackle "käk käk." Frequently, when they believe that they have not been observed or noticed, they will quietly sneak away, crouching low and running fairly fast. Their flight, after they are once started, is quick and often quite protracted, sailing long distances without any movement of the wings, in the manner of the Sharp-tailed Grouse.

These birds always roost on the ground, and usually in the same place, as can be seen from the amount of droppings met with in certain favorite localities. On only a single occasion have I seen three of these birds sitting on a horizontal limb of a juniper, about 2 feet from the ground, which was then covered with about a foot of snow.

Mr. George Bird Grinnell writes me about the habits of these birds as follows: "On a very few occasions I have seen the Sage Grouse standing on the branches of a sage bush, sometimes 2 or 3 feet from the ground, but I imagine that this is quite an unusual position for the bird. This species, commonly, I think, goes to water twice a day, flying down to the springs and creek bottoms to drink in the evening, then feeding away a short distance, but roosting near at hand. In the morning they drink again, and spend the middle of the day on the upland. The young birds, when feeding together, constantly call to one another with a low peeping cry, which is audible only for a short distance. This habit I have noticed in several other species of our Grouse, notably in the Dusky Grouse and the Sharp-tail.

"In western Wyoming the Sage Grouse packs in September and October. In October, 1886, when camped just below a high bluff on the border of Bates Hole, in Wyoming, I saw great numbers of these birds, just after sunrise, flying over my camp to the little spring which oozed out of the bluff 200 yards away. Looking up from the tent at the edge of the bluff above us, we could see projecting over it the heads of hundreds of the birds, and, as those standing there took flight, others stepped forward to occupy their places. The number of Grouse which flew over the camp reminded me of the oldtime flights of Passenger Pigeons that I used to see when I was a boy. Before long the narrow valley where the water was, was a moving mass of gray. I have no means whatever of estimating the number of birds which I saw, but there must have been thousands of them."

According to my own observations, confirmed by that of several other observers in widely different localities, the number of eggs laid by this species usually varies from seven to nine, and I consider eight a fair average number. In sixteen nests examined by me, but one contained ten eggs, three contained nine each, six contained eight eggs, four but seven each, and two less, unquestionably incomplete sets. Mr. W. S. Rougis, of Wyoming, gives the number as from ten to fourteen. Mr. W. M. Wolfe, writes me that the average number is fifteen, and that he has found seventeen eggs in a nest of this species. I have no reason to doubt the correctness of these statements. It only shows that no fixed rule can be laid down in such matters, and what will be found a usual set in one section, or in one season even, will not hold good in another.

The eggs of the Sage Grouse vary in shape from ovate to elliptical ovate and elongate ovate. The coloring matter is all superficial, and easily wiped off on a freshly laid egg, leaving the shell greenish white in some of the specimens and a pale pea green in others. The ground color varies from an olive buff with a greenish tinge, in a few specimens, to écru drab and greenish brown. They are more or less heavily spotted with well rounded and sharply defined spots of chocolate brown, ranging in size from a No. 2 shot to that of mustard seed. The markings vary considerably in amount, some eggs being profusely spotted, while others are but faintly so.

The average measurement of one hundred and nine specimens in the U. S. National Museum collection is 55 by 38 millimetres. The largest egg of the series measures 59.5 by 39.5, the smallest 52 by 36 millimetres.

The type specimens selected to show the differences in size, as well as in the ground color and markings, were obtained as follows: No. 17385 (Pl. 3, Fig. 11), selected from a set of nine eggs, was collected by Mr. F. A. Hirst, near Fort Bridger, Wyoming, May 10, 1877; No. 21095 (Pl. 3, Fig. 12), from a set of eight eggs, was taken near Camp Harney, Oregon, May 28, 1876; and No. 21096, (Pl. 3, Fig. 13), from an incomplete set of five eggs, was taken near Malheur Lake, Oregon, on April 4, 1877. The last two are from the Bendire collection.

## Family PHASIANIDÆ. Pheasants, etc.

### 39. Meleagris gallopavo Linnæus.

WILD TURKEY.

*Meleagris gallopavo* Linnæus, Systema Naturæ, ed. 10, I, 1758, 156.
(B 457, C 379*a*, R 470*a*, C 554, U 310.)

Geographical range: Eastern United States; north to Southern Canada; south to Florida and middle Texas; west to the edge of the Great Plains.

The breeding range of the Wild Turkey, the largest and finest of our game birds, is yearly becoming more and more restricted, and at the present rate of decrease its total extinction east of the Mississippi and north of the Ohio River is only a question of a few years. The northern range of this species may be defined as follows: It is still to be found in small numbers in the thinly populated and wooded portions of Pennsylvania, westward in similar localities to Ohio, southern Michigan, southern Wisconsin, and possibly southern Minnesota, as well as in some portions of Iowa, and a few probably remain in southern and western Ontario, Canada; south through Missouri and Kansas, where they are nearly exterminated, thence through the Indian Territory, eastern and central Texas, where they are still abundant, thence east through all the Gulf States to Florida and north to the first-named State. In the southwestern portions of Indiana and Illinois the Wild Turkey is not uncommon along the extensive river bottoms, and throughout nearly all the Southern States, including Maryland, it is still moderately common in suitable localities, especially in the mountainous districts. It was not uncommon in southern South Dakota and Nebraska within the last ten years, but these birds are no longer found there. At the present time it is most common in the Indian Territory and the thinly-settled portions of eastern and central Texas and Florida.

The Wild Turkey is a resident wherever found. Numerous records attest the abundance of this magnificent game bird throughout the southern New England States in former years, and evidences of its existence have been found in southern Maine.

The Wild Turkey is essentially a woodland bird, and inhabits the damp and often swampy bottom lands along the borders of the larger streams, as well as the drier mountainous districts found within its range, spending the greater part of the day on the ground in search of food, and roosting by night in the tallest trees to be found. From constant persecution in the more settled portions of its range, it has become by far the most cunning, suspicious, and wary of all our game birds, while in sections of the Indian Territory and Texas, where it has till recently been but little molested, it is still by no means a shy bird.

Capt. William L. Carpenter, Ninth Infantry, U. S. Army, writes me as follows: "March, 1880, found me encamped on the Niobrara River, Nebraska,

at the mouth of Minnecadusa Creek, the advance guard to establish the new post of Fort Niobrara. This was then a wild, uninhabited country, covered with oak timber and full of large game. Turkeys were quite numerous, and several were killed near camp. It is generally conceded that this is the most wary of all game birds, yet an incident which occurred in this camp would seem to prove that the all-controlling power of animal appetite was sufficient to overcome natural caution.

"When the camp was first established, some corn was scattered at one end, in the brush. My tent was pitched about 30 yards from this spot, and it was reported that every morning and evening a Turkey came here to feed. It was certainly the first grain the bird had seen, and the new food proved an irresistible attraction. Just before sundown, while I was sitting in the tent, it came from the brush and began feeding in plain sight of several persons, amidst all the noise of a large camp. I watched it for some time, and then, without leaving the tent, 'collected' it, not, however this time, for the 'Smithsonian' as the mess clamored loudly for roast turkey without arsenic."

Dr. T. E. Wilcox, U. S. Army, who is now stationed at Fort Niobrara, Nebraska, informs me that he finds abundant and reliable testimony that the Wild Turkey was found there a few years ago and that this point marked the most western limit of its range. None occur there now.

Dr. William L. Ralph, of Utica, New York, writes me: "Fifteen years ago I found the Wild Turkey abundant in most parts of Florida, north of Lake Okeechobee, with perhaps the exception of the Indian River region, but they have gradually decreased in numbers since then, and though still common in places where the country is wild and unsettled, they are rapidly disappearing from those parts, in the vicinity of villages and navigable waters.

"At that time they would frequent the vicinity of dwellings, and where they were not molested would become quite tame. I have often seen them in company with domestic fowls, and on one occasion, where a wild gobbler associated with some tame hen Turkeys, the chicks that were hatched from their eggs showed their wild blood plainly, both in color and actions. I watched this gobbler with a great deal of interest at the times when the fowls were being fed. At first, when any one was near, he would only come to the edge of some bushes, about 40 yards away, but each succeeding day he came a little nearer, until at last he became almost as tame as the domestic birds, and would feed unconcernedly within a few feet of a person.

"One can hardly believe that the Wild Turkeys of to-day are of the same species as those of fifteen or twenty years ago. Then they were rather stupid birds, which it did not require much skill to shoot, but now I do not know of a game bird or mammal more alert or more difficult to approach. Formerly, I have often, as they were sitting in trees on the banks of some stream, passed very near them, both in rowboats and in steamers, without causing them to fly, and I once, with a party of friends, ran a small steamer within 20 yards of a flock, which did not take wing until several shots had been fired at them.

"Turkeys are still to be found quite commonly in suitable places in the localities where the following observations were made, viz: The southern half of St. Johns County and that part of Putnam County east of the St. Johns River. These birds, though resident, are given to wandering a great deal, and do not, like the Bob Whites, become attached to any particular locality. At times they will remain in a favorable place for weeks, but they are very uncertain, and will often leave such a spot for no apparent reason. When they are molested, or when there is a scarcity of food, they will keep in motion most of the time during the day, and will often travel many miles in a few hours.

"Wild Turkeys usually go in flocks, consisting of from two or three to fifteen or twenty birds, and are also occasionally found singly. Small flocks and single birds are more apt to be found now than formerly, and the large droves, consisting of several flocks associating together, are seldom if ever to be seen of late. Their favorite places of resort are woods with swamps in them or in their vicinity, and they always go to these swamps to roost or when molested.

"These birds are polygamous, and the female takes all the cares and duties of incubation upon herself. The gobblers are very pugnacious, and will often fight fiercely for the favors of the hens. The love season begins in Florida about the middle of February and lasts for about three months, and during this period the gobblers frequently utter their call and are then easily decoyed within gunshot. Native hunters have informed me that the hens roost by themselves at this season of the year.

"The nest is a slight depression in the ground, either at the foot of a tree or under a thick bush or saw palmetto. It is lined sparingly with dead leaves and grass, etc., but I could never find out whether this material was placed there by the birds or was there originally. I think these birds raise but one brood a season, though I have found fresh eggs as early as the middle of March and as late as the 1st of May. I have never found more than thirteen eggs in one nest, nor less than eight, unless they were fresh, the usual number being ten. The chicks of this species are very tender, and as they follow their mothers as soon as hatched I have often wondered how the latter could raise so many as they do. The natives of Florida say that a hen Turkey will desert her nest if the eggs are handled. Whether this be true or not I do not know, for I never tried to find out but once, and then, though the bird was gone on my second visit to the nest, I always had a strong suspicion that she was shot, for its whereabouts was known to several persons besides myself."

These birds feed on beechnuts, acorns (especially those of the white and chinquapin oaks), chestnuts, pecan-nuts, black persimmons, tuñas (the fruit of the prickly pear), leguminous seeds of various kinds, all the cultivated grains, different wild berries and grapes, and the tender tops of plants; also grasshoppers, crickets, and other insects. The actions of the gobbler during the

mating season, while paying court to the female, are similar to those of the domestic Turkey, and well enough known to need no description.

The nesting season, in the southern portion of their range, begins sometimes as early as the middle of February, and later northward, where fresh eggs are occasionally found up to the middle of June. It is more than probable that in such late sets the first eggs were destroyed. The number of eggs to a set varies from ten to fourteen, eleven and twelve being most often found. The nests are usually well concealed, a favorite site being near old stumps surrounded by a dense mass of vines and bushes in bottom lands. Occasionally an exposed situation is also selected.

Capt. William L. Carpenter, U. S. Army, found such a nest on May 1, 1880, near the present site of Fort Niobrara, Nebraska, containing at that time seven eggs. It was a simple affair, on a grassy hillside, in an exposed position, and lined with dead grass, very much like that of the Sharp-tailed Grouse. On May 20, it contained eleven eggs, and on June 1 another visit was paid, when only the vacant nest and broken shells remained.

Bvt. Maj. S. L. Woodward, Tenth Cavalry, U. S. Army, sent me a set of eggs of this species, collected near Onion Creek, Archer County, Texas. This nest was found in the high grass, well protected from observation, near some rain-water holes, several hundred yards from Onion Creek. Happening to stroll close to the nest the hen flew off, and was thus discovered. It contained six perfectly fresh eggs on May 7.

Mr. J. A. Singley writes me: "The hen leaves and approaches the nest invariably by the same route, and remembering this I trailed one to its nest. There really was no nest. A dead blackjack-oak top had fallen, the wind had drifted the leaves up against it, and the eggs were laid on the leaves. I found this nest in a thicket, inside of an inclosure, on April 20. It contained eight eggs."

Sometimes two hens lay in the same nest, and an extraordinarily large set of eggs is the result. Mr. George E. Beyer, of New Orleans, Louisiana, writes me as follows: "On May 25, 1888, I found a nest with twenty-six eggs; one hen sitting on the nest and one standing by. I think both hens kept the same nest. In piney woods they like to build near old pine stumps, as the latter are generally surrounded by a growth of gallberry bushes. The nest is composed of leaves and pine straw. Our swamp Turkeys like to build in hammock lands, near old and disused fields, in blackberry or scrubby post-oak thickets."

The call notes of the Wild Turkey resemble those of the domesticated bird very much; still they differ somewhat. In feeding, their usual note is "quitt, quitt" or "pit, pit." When calling each other it is "keow, keow, kee, kee, keow, keow," and a note uttered when alarmed suddenly sounds somewhat like "cut-cut."

Usually but one brood is raised a season, but Mr. J. S. Cairns, of Weaverville, North Carolina, suspects that a second brood is occasionally raised,

having found eggs of this species as late as July 10. Incubation lasts about four weeks, and this duty is entirely performed by the female.

In shape, the eggs of the Wild Turkey are usually ovate, occasionally they are elongate ovate. The ground color varies from pale creamy white to creamy buff. They are more or less heavily marked with well-defined spots and dots of pale chocolate and reddish brown. In an occasional set these spots are pale lavender. Generally the markings are all small, ranging in size from a No. 6 shot to that of dust shot, but an exceptional set is sometimes heavily covered with both spots and blotches of the size of buckshot, and even larger. The majority of eggs of this species in the U. S. National Museum collection, and such as I have examined elsewhere, resemble in coloration the figured type of *M. gallopavo mexicanus*, but average, as a rule, somewhat smaller in size.

The average measurement of thirty-eight eggs in the U. S. National Museum collection is 61.5 by 46.5 millimetres. The largest egg measures 68.5 by 46, the smallest 59 by 45 millimetres.

The type specimen, No. 21069 (Pl. 3, Fig. 14), selected from an incomplete set of six eggs from the Bendire collection, was obtained by him through the kindness of Bvt. Maj. S. L. Woodward, Tenth Cavalry, U. S. Army, near Onion Creek, Archer County, Texas, May 7, 1874. This specimen shows the lavender markings referred to above.[1]

## 40. Meleagris gallopavo mexicana (Gould).

MEXICAN TURKEY.

*Meleagris mexicana* Gould, Proceedings Zoölogical Society, 1856, 61.
*Meleagris gallopavo* var. *mexicana* Baird, History of North American Birds, III, 1874, 410.

(B 458, C 379, R 470, C 553, U 310*a*.)

Geographical range: Table lands of Mexico, and north to southern border of United States from western Texas to Arizona; south to Vera Cruz (temperate region).

The breeding range of the Mexican Turkey extends from the mountainous portions of southern and western Colorado, through similar regions in New Mexico, Arizona, western and southwestern Texas, into Mexico. In southern Colorado the bird is rare, if still found there, while specimens from the Lower Rio Grande region in Texas seem to be intermediate between true *M. gallopavo* and the *M. gallopavo mexicana*, leaning more toward the latter.

This magnificent game bird, the progenitor of our domestic Turkey, is more of a mountain-loving species than the eastern bird, and is still reasonably abundant in the wilder portions of western Texas, the Territories of New Mexico and Arizona, and very common in portions of Mexico. I believe this subspecies attains a greater size than *M. gallopavo*. I shot a specimen weighing

[1] Since this article was written, Mr. W. E. D. Scott has separated the Florida Turkey from the common Wild Turkey and described it under the name of *Meleagris gallopavo osceola*, in Auk, Vol. VII, 1890, p. 376.

28 pounds, after being drawn, and I have been informed that birds much heavier than this one are killed occasionally; which I can readily believe, as I have seen tracks of this subspecies along the banks of the San Pedro River, in Arizona, measuring between 5 and 6 inches in length, and unquestionably made by a much larger bird than the one killed by me.

Mr. Herbert Brown, of Tucson, Arizona, writes me as follows: "I have seen many of these Turkeys, a few in Arizona, and I believe thousands in Mexico. Without knowing it positively, I am of the belief that they raise two broods of young a season, as I have seen almost all sizes in the masting season (October) when they congregate in large numbers in the cañons to feed on *ballotes*, a small bitter acorn, common to the cañons and parks of southern Arizona and southward. I have seen their roosting places at night, in sycamore (*Alisa*) trees; I also saw one in an oak grove on the side of a hill, but they appear more to favor the cañons. On the headwaters of the Santa Dominga I have seen not less than fifty or sixty in a bunch, and Turkey, in those days, was a common camp fare. I have been told by Mexicans that coyotes catch Turkeys by running in circles under their roosting trees, till the birds get dizzy with watching them, and fall down. I never saw it done, but have been assured that it is a fact.

"This Turkey is quite abundant in the Sierra Ancha, about 130 miles northeast of Tucson, and can be found to a greater or less extent in every timbered range between here and there. One morning while camped in a box cañon in Sonora, southeast of the Sierra Azul, I counted thirty-four Turkeys flying over, at another time six, and quite frequently three and four. Times were not so peaceful then as now, and whenever the Turkeys appeared to fly wild, we would be on the lookout for Apache Indians."

Capt. William L. Carpenter, Ninth Infantry, U. S. Army, writes me as follows: "This bird is quite numerous in the White Mountains, Arizona. I never succeeded in finding the nest, but collected young, able to fly a few feet, on Black River, Arizona, July 1. Their crops contained grasshoppers and leaves. Later in the season acorns, juniper berries, and pine nuts furnish food. It appears to be stronger on the wing than the eastern Turkey and more ready to resort to long flights for safety, frequently alighting in trees for concealment; also, not so readily decoyed by calling."

The mating season commences according to latitude, from March 1 to the middle of April, by which time some of the birds commence nesting.

Mr. William Lloyd states: "In 1881, I found many of their roosts in western Texas; these birds could be seen by hundreds in the Nueces Cañon near Uvalde; they were equally common in the Frio Cañon and the valleys of the Llano and Concho, east to the Colorado River. They mated from the first to the end of March, according to the weather, and would then seek dense brush.

"Near a river their nests would be made on small islets surrounded by reeds; on the hills in shin oak clumps. Their principal food being acorns,

they were most abundant where there was much mast, migrating considerable distances, but in this case only governed by food supply. I have seen them freely eating mesquite beans when they fall in the late summer, and pecan nuts are also a favorite food. They also feed on grasshoppers and other insects during April and May, running after them in the same manner as the Chaparral Cock."

They are summer residents in the higher mountain ranges, reaching an altitude from 8,000 to 10,000 feet, and retiring to the more sheltered cañons and the timbered river valleys in the late fall, congregating at such times in large flocks.

The number of eggs to a set varies from eight to fourteen, rarely more; eleven or twelve are about the average number.

That well-known ornithologist and collector, Mr. F. Stephens, took a probably incomplete set of nine fresh eggs of this species, on June 15, 1884. He writes me: "I was encamped about 5 miles south of Craterville, on the east side of the Santa Rita Mountains in Arizona; the nest was shown to my assistant by a charcoal burner. On his approach to it the bird ran off or flew before he got within good range. He did not disturb it but came to camp, and in the afternoon we both went, and I took my little camera along and photographed it. The bird did not show up again. The locality was on the east slope of the Santa Rita Mountains, in the oak timber, just where the first scattering pines commenced, at an altitude of perhaps 5,000 feet."

A good photograph, kindly sent me by Mr. Stephens, shows the nest and eggs plainly. It was placed close to the trunk of an oak tree on a hillside, near which a good-sized yucca grew, covering, apparently, a part of the nest; the hollow in which the eggs were placed was about 12 inches across and 3 inches deep. Judging from the photograph the nest was fairly well lined.

Capt. B. F. Goss found a nest of this subspecies, on May 9, 1882, in southern Texas, containing eleven eggs. He states: "It was as usual on the ground, in open, bushy country. A coarse structure, not very deeply excavated, lined with grass, weeds, and leaves, placed in quite an open situation, but well concealed by a few small bushes and bunches of growing grass.

"We were encamped quite near the nest; one morning I noticed a hen Turkey stealing through the bushes, and suspected she was going to her nest. We watched her carefully for three mornings, and having pretty nearly located the nest, commenced a close search, and examined, as we thought, every inch of ground. I was about giving up, when looking down almost at my feet, I saw the bird sitting on the nest. She at once ran; she had allowed me to pass several times within a foot of her without moving, and seemed to know at once when she was seen. I have often noticed this trait in birds of this genus; as long as unseen you can tramp all around them, but they seem to know at once when they are seen, and lose no time in getting away."

The Mexican Turkey, like the eastern subspecies, is polygamous, and the female attends exclusively to the duties of incubation, which lasts about four

weeks, the male not only not assisting, but, according to observations made by Lieut. J. M. F. Partello, Fifth Infantry, U. S. Army, they often destroy the eggs and the tender young.

In addition to the different foods already mentioned, I know from personal observation that the Mexican Turkey is exceedingly fond of the wild mulberry, as well as the fruit of the prickly pear, which in southern Arizona attains a very respectable size; and again of the somewhat smaller but still more palatable fruit of the giant cactus, the pitayah or the sahuara of the natives, which is alike a favorite article of food with man, bird, and beast.

The only eggs of this species in the U. S. National Museum collection, about whose identity there can be no possible doubt, were collected on Upper Lynx Creek, Arizona, in the spring of 1870, by Dr. E. Palmer, whose name is well known as one of the pioneer naturalists of that Territory.

The eggs are ovate in shape, their ground color is creamy white, and they are profusely dotted with fine spots of reddish brown, pretty evenly distributed over the entire egg. The average measurement of these eggs is 69 by 49 millimetres. The largest measures 70.5 by 49, the smallest 67 by 48 millimetres.

The type specimen (No. 15573, U. S. National Museum collection, Pl. 3, Fig. 15) is one of the set referred to above.

## Family CRACIDÆ. Curassows and Guans.

### 41. Ortalis vetula maccalli Baird.

CHACHALACA.

*Ortalida maccalli* Baird, Birds of North America, 1858, 611.
*Ortalida vetula* var. *maccalli* Baird, History North American Birds, III, 1874, 398.
(B 456, C 378, R 469, C 552, U 311.)

Geographical range: Northeastern Mexico from Vera Cruz, north to lower Rio Grande Valley (both sides).

The Chachalaca occupies but a very restricted area within the borders of the United States, being found only along the thickly-timbered river bottoms of the Rio Grande, from its mouth to a short distance above Fort Ringgold, Texas, a distance of about 100 miles. It is common in suitable localities in this region, and breeds wherever found.

Asst. Surg. James C. Merrill, U. S. Army, in his notes on the "Ornithology of southern Texas," writes as follows: "The 'Chachalac,' as the present species is called on the Lower Rio Grande, is one of the most characteristic birds of that region. Rarely seen any distance from woods or dense chaparral, they are abundant in those places, and their hoarse cries are the first thing heard by the traveler on awaking in the morning. During the day, unless rainy or cloudy, the birds are rarely seen or heard; but shortly before sunrise and sunset they mount the topmost branch of a dead tree, and make the woods ring with their discordant notes. Contrary to almost every description of their

cry which I have seen, it consists of three syllables, though occasionally a fourth is added. When one bird begins to cry, the nearest bird joins in at the second note, and in this way the fourth syllable is made; but they keep such good time that it is often very difficult to satisfy oneself that this is the fact. I cannot say certainly whether the female utters this cry as well as the male, but there is a well-marked anatomical distinction in the sexes in regard to the development of the trachea. In the male this passes down the outside of the pectoral muscles, beneath the skin, to within about 1 inch of the end of the sternum; it then doubles on itself and passes up, still on the right of the keel, to descend within the thorax in the usual manner. This duplicature is wanting in the female. These birds are much hunted for the Brownsville market, though their flesh is not particularly good, and the body very small for the apparent size of the bird. Easily domesticated, they become troublesomely familiar, and decided nuisances when kept about the house. Beyond Ringgold Barracks this species is said to become rare, and soon to disappear; and it probably does not pass more than 50 miles to the north of the Rio Grande. The nests are shallow structures, often made entirely of Spanish moss, and are placed on horizontal limbs a few feet from the ground."[1]

Mr. George B. Sennett, in his "Further Notes on the Ornithology of the Lower Rio Grande of Texas," made during the spring of 1878, makes the following statement about this species: "Preëminently a bird of the woods; and Lomita, without doubt, is the heart of its very limited habitat in the United States. Here it is resident; and among the heavy timber and dense undergrowth it breeds in seclusion, secure from its enemies. A more intimate acquaintance with this bird enables me to give a better description of its notes than the attempt in my former memoir. The notes are loud, and uttered in very rapid succession, and those of the female follow those of the male so closely, while so well do they harmonize, although in different keys, that I mistook the first note of one for the last note of the other. It really utters but three syllables, thus: 'cha-cha-lac,' instead of four, 'cha-cha-lac-ca,' as given before. It also has a hoarse grating call or alarm note, uttered in one continuous strain and without modulation, something like 'kak-kak-kak.' Generally this bird is seen in trees, but on one occasion four or five were seen running about on the ground, after the manner of chickens when freed from a coop. It does not breed in communities, but in isolated pairs, and from all accounts raises but one brood in a season, unless the nest is despoiled, when it will lay another clutch. The clutch almost invariably consists of three, rarely less. On the 10th of April we obtained fresh eggs, and on the 20th sets were generally full and fresh, after which time they contained embryos. The eggs were exceedingly hard to drill. The chicks are hatched well coated with down, and they leave the nest as soon as hatched, the old ones leading them into the thickets, where they are very hard to capture. I had the pleasure, at the ranch, of seeing six hatch under a hen. The little ones looked and acted exactly like

[1] Proceedings U. S. National Museum, Vol. I, 1878, p. 159.

chickens, picking up the corn-batter thrown to them, running in and out from under the hen's wings, and jumping upon her back. Four of the six died within the first two weeks, but the others lived and thrived. A few are domesticated every year at almost every ranch, and they become inconveniently familiar, getting about under foot, jumping upon tables, beds, etc.

"The young from the eggs are thickly covered with down. Upper parts mixed ash, fulvous, and brown, with a black line from the crown to the tail and a black patch on the forehead; under parts white, with the exception of the jugulum, which is fulvous ash, meeting the same colors above. When three or four weeks old, the fulvous ash and white become tawny, and the black only shows on the crown and the forehead."[1]

The breeding season begins about April 10, and lasts till the beginning of July. Mr. J. A. Singley writes me that he took eggs on June 2—probably a second laying, the first eggs having been taken or destroyed. He says: "I found this bird abundant on the Lower Rio Grande. It is a noisy fellow, and two or three can make noise enough to make the listener think that there are a dozen or more birds at hand. Noisy as they are, it is a hard matter to get sight of one, and I found the most successful plan was to hide in the thicket and wait for the birds to put in an appearance. No matter how quickly and stealthily you approached one when singing (?), he would notice you and quickly take his departure. I never saw one on the ground. They are noisiest in the morning and just before a rain.

"All the nests I found were in mesquite stubs, where the limbs had been cut off to make brush fences. These limbs are never cut close to the tree, and being close together form a cavity; leaves and twigs will fall in this and accumulate, and the bird occupies it as a nesting site. I did not find a nest that I could say was built by the bird. When the nest is approached the bird quietly flies off, rarely remaining in sight, and soon calls up its mate."

According to most observers, three eggs are said to usually constitute a full set, rarely more. Mr. Thomas H. Jackson, of West Chester, Pennsylvania, informs me, however, that of forty-four sets received by him this season (1890), all but one contained four eggs, the other being a set of three. The first of these sets was found May 13, the second May 29, and the balance between that date and July 1. In 1889, he received a single set of five, which must be considered an unusually large one. These eggs were all collected near Rio Grande City, Texas.

The eggs of the Chachalaca are a pale creamy white in color, varying in shape from ovate to short ovate, as well as elongate ovate. The shell is extremely thick, rough to the touch, and strongly granulated. The average measurement of twenty-five specimens in the U. S. National Museum collection is 58.5 by 41.5 millimetres. The largest egg measures 65.5 by 47, the smallest 53.5 by 40 millimetres.

[1] U. S. Geological and Geographical Survey, Vol. v, No. 3, pp. 426, 427.

The type specimen, No. 21068 (Pl. 3, Fig. 16), from a set of three eggs, was collected by Mr. George B. Sennett, near Lomita Ranch, Hidalgo, Texas, May 12, 1877.

## Family COLUMBIDÆ. Pigeons.

### 42. Columba fasciata Say.

BAND-TAILED PIGEON.

*Columba fasciata* Say, Long's Expedition, II, 1823, 10.
(B 445, C 367, R 456, C 539, U 312.)

Geographical range: Western United States, from Rocky Mountains to the Pacific coast; south, through Mexico, to highlands of Guatemala.

The Band-tailed Pigeon is an irregular inhabitant of western North America, ranging from British Columbia south through Washington, Oregon, California, Arizona, New Mexico, and northwestern Texas into Mexico and Guatemala. In British Columbia, Washington, and Oregon, it is a summer resident, and only occurs regularly west of the Cascade Range, near the coast, while east of these mountains it can only be considered as a straggler, due, no doubt, to the absence of oak forests in these regions. It has also been observed in Colorado, Nevada, and Idaho, but it is doubtful if it can be considered as of regular occurrence in these localities. It probably breeds throughout the range thus indicated. In Arizona, southern New Mexico, and northwestern Texas it is found throughout the year.

Capt. William L. Carpenter writes me as follows: "The Band-tailed Pigeon occurs in the mountain regions of northern Arizona. It is sometimes quite numerous in the vicinity of Prescott, in August and September; at other seasons, without any apparent reason, very rare. It is always to be found in summer in the foothills of the White Mountains, at about 5,000 feet elevation, wherever the oak grows, although not plentiful, and always quite shy. I saw them in this region in small flocks during May, June, July, August, and September, and although not successful in finding the nest, I feel confident that they breed here.

"As far as my observation extends, this species is most numerous near the mouth of the Columbia River, where immense flocks were to be seen from May to October in 1865, which fairly rivaled those of the Passenger Pigeon, once so common over the Atlantic watershed. Their favorite food in this region appeared to be salmon berries, *Rubus nutkanus*."

Mr. H. W. Henshaw, in his article on the "Birds of the Upper Pecos River, New Mexico," makes the following statement regarding this species: "None of these birds nested near our camp, though they probably did so not far away. The latter part of August they were found feeding upon the berries of the *Sambucus racemosa*, a small shrubby plant from 2 to 4 feet high. Subsequently, when the acorns began to grow large, long before they began to ripen, they appeared to devote themselves exclusively to them, and

between the Pigeons and the squirrels not an acorn was allowed to ripen. The acorns were of the scrub oak, *Quercus undulata* (two varieties), and are extremely palatable. Pigeons were shot not only with their crops full, but with the gullet crammed up to the very bill."[1]

Mr. L. Belding states: "I have seen but few of these birds in the mountains of California in summer, though it probably breeds there, as I have occasionally shot young birds at Big Trees, apparently about a month old. They were, at that age, excellent food, which cannot be said of it at any other time, its flesh being very bitter from eating acorns in winter and oak buds in spring. "It is sometimes common in the foothills in winter, but never abundant, as compared with the abundance of the Passenger Pigeon of the Atlantic States."[2]

Mr. Charles H. Townsend, in his "Field Notes on the Birds of northern California," says: "The Band-tailed Pigeon is very abundant in the foothills of the Lower McCloud River, in the fall and winter, gathering in the pine trees on the higher ridges in immense flocks. It was very seldom seen in the high mountains in summer, and did not appear to descend at all to the valleys in winter. I do not know where it breeds."[3]

Mr. O. B. Johnson, in his "List of the Birds of the Willamette Valley, Oregon," states: "An abundant summer resident, feeding chiefly on berries. They nest in various situations, much like the common Dove, *Z. carolinensis*. I found one of leaves and moss beside a tree, placed on the ground between two roots; another one upon an old stump that had been split and broken about 8 feet from the ground; another was in the top of a fir (*A. grandis*), and was built of twigs laid upon the dense flat limb of the tree, about 180 feet from the ground. These each had two eggs, pure white, and elliptical, differing from those of *Z. carolinensis* only in size; a set before me measuring 1.60 by 1.20, and 1.55 by 1.19 inches" (equaling 40.6 by 30.5, and 39.4 by 30.2 millimetres.)[4]

Mr. A. W. Anthony states: "This Pigeon is a common summer resident in Washington County, Oregon. South of Beaverton is a large spring, the waters of which contain some mineral which has great attraction for these Pigeons, and here they are always found in large numbers."[5]

Mr. Henry E. Ankeny writes me from Jacksonville, Oregon, as follows: "The Band-tailed Pigeon is not very common in the Rogue River Valley, Oregon, excepting when there is a good acorn crop. In such years they are occasionally quite plentiful in the fall months. Only a few scattering pairs breed here; all the nests I have seen have been placed on limbs of small firs, generally in thickets of these trees. They lay two eggs, and I believe rear but a single brood a season."

Mr. William Lloyd informs me as follows: "The Band-tailed Pigeon breeds in the mountains in Presidio County, and occasionally in the neigh-

[1] Auk, Vol. III, 1886, p. 80.
[2] Proceedings U. S. National Museum, 1878, Vol. I, p. 437.
[3] Proceedings U. S. National Museum, 1887, Vol. X, p. 200.
[4] American Naturalist, July, 1880, pp. 638, 639.
[5] Auk, 1886, Vol. III, p. 164.

borhood of Fort Davis, Texas. They are exceptionally abundant in the aforesaid mountains, in July, where they collect in large flocks to feed on the wild grapes, and afterward disperse in search of acorns. Each flock I saw was under the guidance of a leader who would fly around a tree several times alone, and when satisfied there was no danger it would alight, and the rest of the band followed its example. These flocks ranged from twenty to fifty. I only found eggs of this species in Mexico. They are abundant all down the Sierra Madre to at least the Sierra Nevada de Colima. It lays two eggs to a set, and I found them nesting on June 2. The nests are placed on limbs of trees, oaks preferred."

The Arizona records of the nesting of this species differ as far as the number of eggs are concerned. Mr. F. Stephens writes me that he found three nests of this species at an altitude of from 5,000 to 8,000 feet in Arizona. They prefer the open forest, where the oaks and pines mix, nesting on both kinds of trees. The nest consists of a very slight platform of sticks In one case it was composed of a few pine twigs laid across a horizontal fork of a small branch of pine, about 20 feet from the ground. Another nest was but 8 feet, and the third 12 feet, from the ground. The earliest date of nesting was March 6, 1877, the latest July 18. Each nest contained but a single egg."

In my notes on a collection of eggs from southern Arizona, made by Lieut. Harry C. Benson, Fourth Cavalry, U. S. Army, at Fort Huachuca, I make the following statement based upon his observations: "This Pigeon is fairly common in the vicinity of Fort Huachuca during the summer months, arriving about June 1 to 10 in large flocks, frequenting the oak groves along the foothills and mountain sides. It feeds on a berry about the size of a large pea, growing on a hardwood tree not known to Lieutenant Benson, till the acorns are of suitable size, about July 15, when it feeds almost exclusively on them.

"It commences nesting about the beginning of July, and continues to lay till late in October; it does not breed in communities, however, there being but one or two nests to the acre. The nests are placed in live-oak trees (*Quercus undulata?*), from 15 to 30 feet from the ground. The nest is simply a slight platform of twigs on which the egg is laid. Eggs were taken from July 13 to September 25, 1885, inclusive.

"But a single egg is laid in a clutch, in that vicinity at least. This is elliptical ovate in shape, abruptly pointed at the smaller end; pure white in color, slightly glossy, and the five specimens sent measure 1.58 by 1.10, 1.62 by 1.10, 1.62 by 1,13, 1.68 by 1.04, 1.69 by 1.09 inches" (equal to 40.1 by 27.9, 41.1 by 27.9, 41.1 by 28.7, 42.7 by 26.4, 42.9 by 27.7 millimetres).[1]

Mr. Otho C. Poling has also made some further observations regarding the Band-tailed Pigeon during the season of 1890, in close proximity to Fort Huachuca, Arizona, and I make such extracts from his notes as are of

[1] Proceedings U. S. National Museum, 1887, Vol. x, p. 551.

especial interest. He writes me under date of May 5: "I have camped for the past month in Ramsey's Cañon, which is the most heavily wooded one in this locality, situated in about the center of the Huachuca Mountains. About a quarter of the way up, close to the main trail, at an elevation of about 6,000 feet, is a swampy spring, around which several acres of wild mulberry trees and bushes grow. I camped close to this place, and Pigeons were always about in abundance. Probably sixty pairs visited or staid about this spring at all times.

"I shot a number of these birds for food, and one day on approaching one sitting on a spruce bough, about 10 feet up, and not being able to start it from its perch for a wing shot, I put a 'hummer load' in my gun, and brought it down in rather a mutilated condition, as I was not over 6 feet off. It proved to be a female, and much to my surprise I found that the dust shot had smashed an egg, which I found embedded in the feathers of her belly. As I could find no sign of a nest on the limb on which she had been sitting, and the egg was entirely surrounded with feathers, I concluded she must carry it around with her. This was on March 30, and the egg was fresh.

"During the month of April, being very busy with other matters, I gave only a day or two to searching for the nests, and was not successful in finding any. On April 14, I killed a few young, about a month old, and an adult female with an egg in her ovary, about one-third size. On May 3, I made another trial, and during a hard day's hunt I found five nests, each containing a single well-incubated egg. These nests were all found in spruce pines, from 15 to 70 feet up, and were constructed simply of a few small twigs laid across a limb. Next day I found four more nests; one in an oak, 12 feet up, containing a squab about a week old; another in a mulberry, about 8 feet from the ground, with a fresh egg, and two others in spruce pines. On approaching one of these trees the female flew off heavily, and seemed to be trying to balance herself on a limb of a tree, far down below. When I climbed to the nest I found no egg in it, and am almost certain she carried it off with her. I also allowed the female to fly off from the next nest, and likewise found it without an egg. Wishing to test the matter, I afterward shot several females on the nest. In one case one dropped to the ground, and with her came the egg, breaking and spreading egg and shell among the feathers of the belly."

In some later notes sent, Mr. Poling says: "Since writing to you in regard to the Band-tailed Pigeon, on May 5, I have taken over a dozen eggs, which show my previous experiences to be *exceptions* to the rule, or else are due to difference in season or locality. As far as my knowledge now extends, I am somewhat puzzled in regard to these birds. The fact of their nesting at all seasons, without any regularity, seems to be well established, as I have taken young, two or three months old, in February; and since that time young and eggs enough to show that they lay and nest from December to August, my

last fresh egg having been taken only a few days later; and the females examined show that they will lay on for two months more at least.

"In regard to their carrying the egg about I have, in addition to the cases noted, shot two other females having the egg embedded in the feathers of the belly, and further, held by the legs while flying; but in such cases they seem simply to alight on the limb of a spruce and incubate there without any nest. This accounts for the shooting of Pigeons having a broken egg smeared over the feathers, as I have done when no nest was to be seen. I have found them nesting on oaks, maple, and spruce trees, often in old nests of some other bird, or on a slight platform of twigs laid loosely on a flat limb.

"These birds sit closely, and allow one to go much nearer them than when merely feeding or resting. In fact, this is the only way to know when you have found a nest. The entire bird may be in plain sight, but no nest can be seen from below, even when within 10 feet of her; and I had generally to note the spot from whence she flew, and climb above this, when on looking down the egg might be seen, which usually laid directly over the limb, and hence was invisible from below. The average distance of the nests from the ground is about 10 feet, the extremes being 6 and 70 feet.

"Pigeons are most plentiful in these mountains during the months of June and July. They are then scattered over the entire range, from the oak groves at the bases of the foothills to the pines at the highest point. They, however, have certain points where they congregate, favorite feeding grounds, which are generally near the mouth of a cañon, and to which they repair regularly, coming and going singly or in pairs and flocks of all sizes. In coming down from the higher points to these feeding places their flight is exceedingly swift, and the noise made by their wings is wonderful. It appeared to me similar to the rush of steam from an engine, and can be heard when the birds are scarcely visible and a thousand yards overhead. The crop of a good-sized male after feeding contains from twenty-five to fifty acorns."

I have quoted, without further comment, the remarkable statement of Mr. Poling, in regard to the alleged removal of eggs by this Pigeon.

Undoubtedly the irregular distribution of the Band-tailed Pigeon at certain times is due, to a large extent, to the comparative abundance of its favorite food, acorns, which are found only in certain localities. On the eastern slopes of the Sierra Nevada in California, and the Cascade Range in Oregon and Washington, oaks are but seldom seen; hence the scarcity of these birds. I have seen flocks of the Band-tailed Pigeon repeatedly while stationed in southern Arizona, but only along the foothills of the mountains where oaks were abundant. The fruit of some of these trees is exceedingly sweet and palatable, equal to the best of nuts. There is, however, a great deal of difference in the taste of these acorns. While on one tree sweet ones may be found, those of the next, although of apparently the same species,

may be bitter and unfit to be eaten by man, though quite acceptable to these birds.

In southern Arizona, at least, it would appear that the breeding season of the Band-tailed Pigeon covered nearly every month in the year, and several broods must be reared by each pair during the season. In Oregon and Washington two broods are probably the usual number.

In Arizona the nests of this species seem to be always placed in trees, while in Oregon, according to Prof. O. B. Johnson, they breed occasionally on the ground. This statement is confirmed by Dr. Cooper, who says: "In June they lay two white eggs, about the size of those of the House Pigeon, on the ground, near streams or openings, and without constructing any nests."[1]

In southern Arizona, according to the observations of several well-known and reliable collectors, but a single egg is laid at a sitting, and, as far as I am aware, at no time have two been found. Their cooing resembles that of the domestic Pigeon, and the young are fed in a similar manner. Incubation lasts from eighteen to twenty days, both sexes assisting. The young grow rapidly, and are able to leave the nest when about a month old.

The egg of the Band-tailed Pigeon is large for the size of the bird, and is somewhat peculiar in shape. This may be called a pointed elliptical ovate. All the eggs I have seen show this feature. They are pure white in color, the shell is close grained, smooth, and slightly glossy.

The average measurement of thirteen specimens is 40 by 28 millimetres; The largest of these eggs measuring 43.5 by 30, the smallest 38 by 27 millimetres.

The type specimen (No. 23240, U. S. National Museum collection, Pl. 3, Fig. 17) was obtained by Lieut. H. C. Benson, U. S. Army, near Fort Huachuca, Arizona, on September 25, 1885.

## 43. Columba fasciata vioscæ Brewster.

VIOSCA'S PIGEON.

*Columba fasciata vioscæ* Brewster, Auk, v, 1888, 86.
(B —, C —, R —, C —, U 312*a*.)

Geographical range: Lower California.

According to Mr. Brewster, this newly-described subspecies differs from the Band-tailed Pigeon in being a trifle smaller; the tail band is wanting, or only faintly indicated; the ground coloring lighter and more uniform; the vinaceous tints, especially on the head, neck, and breast, much fainter and more or less replaced by bluish ash. It has been named after Mr. Viosca, the U. S. consul at La Paz, Lower California.

Little is known regarding the habits of this bird, which are probably very similar to those of the preceding subspecies.

[1] Birds of North America, Vol. III, p. 363.

Mr. M. A. Frazar, while collecting near Pearce's Ranch, in Lower California, obtained two nests, each containing a single egg. One of these is now before me. This egg was taken July 19, 1887, and the nest in which it was found was composed of a few sticks, placed on a broken upright branch in the center of a giant cactus, about 18 feet from the ground. The egg was fresh; it is pure white, slightly glossy, elliptical ovate in shape, and not quite as notably pointed at the small end as the eggs of *Columba fasciata;* it measures 38 by 26.5 millimetres.

The type specimen (No. 23946, U. S. National Museum collection, Pl. 3, Fig. 18) above described was kindly donated by Mr. William Brewster.

## 44. Columba flavirostris Wagler.

RED-BILLED PIGEON.

*Columba flavirostris* Wagler, Isis, 1831, 519.
(B 446, C 368, R 457, C 540, U 313.)

Geographical range: Mexico and Central America; south to Costa Rica; north to southern Texas, southern Arizona, and Lower California.

The Red-billed Pigeon can only be considered as a summer visitor over the greater portion of its range within the borders of the United States. It is most commonly found along the heavily-timbered bottom lands of the valley of the Rio Grande, in Texas, where it breeds abundantly, and a few may possibly remain throughout the year near the mouth of that river. It extends thence into southern Arizona, but is of rare occurrence in that Territory.

Mr. George B. Sennett, in his "Birds of the Rio Grande of Texas," gives the following account of this interesting species: "I found this fine large Pigeon common in heavy timber, more especially in the tall scattered clumps near the larger tracts. Its appearance is so marked that it can be recognized at all times from other members of the family. Like all Pigeons, it is fond of the water. Any morning will find numbers of all the different species going to and coming from the sand-bars in the river, where they are in the habit of drinking and bathing.

"The cooing of this bird is clear, short, and rather high pitched. It is more secluded in its habits than any of the others, except the one I have lately found new to our fauna, *Æchmoptila albifrons.* In point of numbers it is much less numerous than the Carolina and the White-winged Doves; still it is shot quite extensively for the market. I found it breeding, and secured several sets of nests and eggs. * * *

"On April 30, I found my first nest of this bird in the vicinity of Hidalgo. The locality was a grove of large trees, with undergrowth, and clumps of bushes matted with vines. While prying about the thick vines, I flushed the bird off its nest, and it alighted in one of the tall trees near by. It took me but a moment or two to examine the nest and shoot the bird. In less than ten

minutes' time I had also its mate. The nest was only 8 or 9 feet from the ground, and set upon the horizontal branches of a sapling, in the midst of the vines. It was composed of sticks, lined with fine stems and grasses, had a depression of an inch or more, and was about 8 inches in outside diameter by 2½ inches deep. It contained one egg with embryo just formed. Dissection of the bird showed that she would have laid no more.

"On May 8, at Lomita Ranch, a few miles above Hidalgo, in the fine grove of ebonies in the rear of the buildings of the ranch, I found two nests. Both were well up in trees, one about 25 feet and the other about 30. The nests were situated close to the body of the trees, on large branches, and were composed of sticks and grasses, with an inside depth of about 2 inches. One contained a single egg far advanced, in the other also lay a solitary egg, from which a young chick was just emerging. The parents persisted in staying about, notwithstanding we were making a great disturbance, even shooting into the same trees. Whenever we would go off some distance, they would immediately go on their nests, and seemed loath to leave on our return. These were the only ones seen breeding so near habitations. The grove was a common resort for man and beast, besides being the place where wagons, tools, etc., were kept and repaired. * * *

"From my observations I conclude that the Red-billed Pigeon breeds on our extreme southern border during April and May, that it builds a nest differing from those of other Pigeons, and lays but one egg. * * *

"The shape of my five eggs of the bird under consideration is oblong oval, with the greatest diameter in the center. Some vary slightly, tending sometimes to double pointed, and again to double rounded. The color is pure white. They measure 1.60 by 1.10, 1.55 by 1.12, 1.60 by 1.08, 1.48 by 1.08, and 1.46 by 1.07 inches, averaging 1.54 by 1.09 inches" (equaling 40.6 by 27.9, 39.4 by 28.4, 40.6 by 27.4, 37.6 by 27.4, and 37.1 by 27.7 millimetres, averaging 39.1 by 27.9 millimetres).[1]

In his "Further Notes on the Ornithology of the Lower Rio Grande of Texas," Mr. George B. Sennett gives the following information regarding this species: "Through the kindness of Dr. S. M. Finley, U. S. Army, who was stationed at camp near Hidalgo, and a good observer of animal life, I obtained valuable information concerning the arrival and departure of the Pigeons. In answer to my inquiries in regard to this species, he gave the following from his note book for 1878: 'First noticed on January 24, in flocks; about the middle of February they were seen in the woods in pairs, and cooing. The last seen of them, in 1887, was the latter part of November. These Pigeons were seen several times consorting with tame Pigeons in the ebony trees in the neighborhood of the village of Hidalgo.' This bird is resident, therefore, on the Lower Rio Grande about ten months in the year. The remaining two months it is probably in the more central part of our continent, wandering in flocks from place to place in search of food.

[1] Geological and Geographical Survey, Hayden, 1878, Vol IV, No. 1, pp. 45, 46.

"On April 9, the day after my arrival at Lomita, I went to Hidalgo to make arrangements about mail, supplies, etc. About a mile above the village, on familiar collecting ground of the season before, I discovered a Red-billed Pigeon on her nest in a thicket, and about 8 feet from the ground. It was not until I had approached to within arm's length that she arose and, tumbling heavily into the bushes, fluttered away over the ground in capital feint of injury, in order to attract attention away from the nest. The nest, made of twigs, was frail, saucer-shaped, and contained a single nearly fledged young. This bird breeds irregularly, and lays several times in a season. I found nests, during the whole time of my stay, containing eggs and young in all stages of development, but in no case did a nest contain more eggs or young than a single one. The parents are fond and affectionate, and both assist in incubation. Their food, when I saw them, was chiefly the hackberry fruit.

"The young from the egg have the upper parts plumbeous and sparsely covered with dark hair-like feathers. Under parts are pale and naked. The half-grown young have plumage on the body like the adult. Head and flanks do not become feathered until bird is nearly fledged, and in the half-grown young, just commences to show. From a large series of eggs I find them to average 1.55 by 1.10 inches (equal to 39.4 by 27.9 millimetres), the length varying from 1.60 to 1.45 inches (equal to 40.6 to 36.8 millimetres), and the breadth from 1.18 to 1.03 inches (equal to 45.7 to 26.2 millimetres)."[1]

Asst. Surg. James C. Merrill, U. S. Army, writes me as follows: "This handsome and large Pigeon is found in abundance during the summer months, arriving in flocks of fifteen or twenty about the last week in February. Though not very uncommon about Fort Brown, it is much more plentiful a few miles higher up the river, where the dense woods offer it the shade and retirement it seeks. Three nests, found in a grove of ash trees on the banks of the Rio Grande, near camp at Hidalgo, were frail platforms of twigs, such as are usually built by other Pigeons. Each contained one egg. These are of a pearly whiteness, and average 1.50 by 1.08 inches (equal to 38.1 by 27.4 millimetres). Both sexes incubate.[2] * * *

Capt. William L. Carpenter, Ninth Infantry, U. S. Army, writes me: "While at Fort Grant, Arizona, July 25, 1886, three specimens of this species were shown me, which had been shot that day near the post, in the foothills of the Graham Mountains, which would indicate that these birds breed in Arizona. Graham Mountain is distant about 90 miles from the Mexican border."

I can add nothing new to these accounts; the length of incubation is probably the same as that of the Band-tailed Pigeon and a single egg seems to constitute a set.

There are only four eggs of this species in the U. S. National Museum collection; the shape of two of these may be called elliptical oval, the re-

[1] U. S. Geological and Geographical Survey, Hayden, 1879, Vol. v, No. 3, pp. 422, 423.
[2] Proceedings U. S. National Museum, 1878, Vol. I, p. 157.

maining two, including the type specimen, are slightly pointed at the smaller end. Their color is pure white with but little gloss.

The type specimen (No. 20831, U. S. National Museum collection, Pl. 4, Fig. 2), was collected near Hidalgo, Texas, April 26, 1878, by Asst. Surg. James C. Merrill, U. S. Army. It measures 40 by 27.5 millimetres, another 39 by 27.4 millimetres, and the remaining two specimens, each measure 37 by 27.5 millimetres.

## 45. Columba leucocephala Linnæus.

WHITE-CROWNED PIGEON.

*Columba leucocephala* Linnæus, Systema Naturæ, ed. 10, I. 1758, 164.
(B 447, C 369, R 458, C 541, U 314.)

Geographical range: Southern Keys of Florida, Greater Antilles, Bahamas, also Santa Cruz, St. Bartholomew, and probably other islands of the Virgin Group and Little Antilles, also along the coast of Honduras.

The breeding range of the White-crowned Pigeon within the borders of the United States is confined to the southern Florida Keys.

Mr. W. E. D. Scott, in his paper on the "Birds of the Gulf Coast of Florida," refers to this species as follows: "A regular summer resident at Key West and vicinity, and Mr. Atkins also took it on one occasion at Punta Rassa (see Auk, Vol. v, p. 185). Though a regular summer resident, it seems not at all common at Key West, though quite abundant on neighboring keys in July, August, and September. Mr. Atkins says that they arrive at Key West from May 1 to 15, and remain till November."[1]

Dr. Henry Bryant, in his "List of Birds seen at the Bahamas in 1859," makes the following statement about this species: "This bird is a constant resident, though not frequently seen in winter, at which time it is much less gregarious in its habits than in spring and summer. The number is probably augmented, during and after the breeding season, by birds that have passed the winter further south. It breeds in communities, in some places, as at Grassy Kays, Andros Island, in vast numbers; here the nests were made on the tops of the prickly pear, which cover the whole kay; at the Biminis and Buena Vista Kay, Ragged Island, on the mangroves; and at Long Rock, near Exuma, on the stunted bushes. I do not think they ever select a large kay for their breeding place. The eggs are laid by the middle of May, and the young leave the nest about the 1st of July, previous to which great numbers are killed by the negroes. It is a shy bird when not breeding, even in the most uninhabited localities. Its food consists entirely of berries and fruits."[2]

According to Audubon, the White-headed Pigeon arrives on the southern keys of Florida about the 20th of April, sometimes not till the 1st of May. They are at all times exceedingly wary, probably on account of the war that

[1] Auk, VI, 1889, p. 246.
[2] Proceedings Boston Society Natural History, 1859, pp. 121, 122.

is incessantly waged against them, their flesh being very juicy and finely flavored. This shyness is only partially abated, even during the breeding season, as they will silently slide from their nest when sitting, if it is approached, and retreat to the dark shade of the mangroves, and do not return for an interval to their charge. They were more abundant in the more southern keys, except the sterile Tortugas.

Audubon found the nests placed high or low, according to circumstances, but never saw two on the same tree. He has met with them on the top of a cactus only a few feet from the ground, or on a low branch of a mangrove almost touching the water. They are said to resemble those of the common Passenger Pigeon, but are more compact and better lined, the outer part being composed of small dry twigs, the inner of fibrous roots and grasses. The eggs are two, of an opaque white, roundish, and as large as those of the common Pigeon. Audubon thinks that these birds may have several broods in a season.[1]

I am unable to add anything new to these accounts. The eggs of this species in the U. S. National Museum collection, obtained mostly from Cuba and the Bahamas, are more glossy, and the shells are much smoother, than in the eggs of other species of this family. They are pure white in color and elliptical oval in shape; some are nearly oval.

The average measurement of eleven specimens in the U. S. National Museum collection is 37 by 26.5 millimetres. The largest egg measures 39.5 by 26, the smallest 34.5 by 26 millimetres.

The type specimen (No. 556, Pl. 4, Fig. 4), from a set of two, was collected on Indian Key, Florida, in the spring of 1859, by Mr. G. Würdemann.

## 46. Ectopistes migratorius (Linnæus).

PASSENGER PIGEON.

*Columba migratoria* Linnæus, Systema Naturæ, ed. 12, I, 1766, 285 (♂).
*Ectopistes migratoria* Swainson, Zoölogical Journal, III, 1827, 362.
(B 448, C 370, R 459, C 543, U 315.)

Geographical range: Deciduous forest regions of eastern North America; west, casually, to Washington and Nevada; Cuba.

The breeding range of the Passenger Pigeon to-day is to be looked for principally in the thinly settled and wooded region along our northern border, from northern Maine westward to northern Minnesota; in the Dakotas, as well as in similar localities in the eastern and middle portions of the Dominion of Canada, and north at least to Hudson Bay. Isolated and scattering pairs probably still breed in the New England States, northern New York, Pennsylvania, Michigan, Wisconsin, Minnesota, and a few other localities further south, but the enormous breeding colonies, or pigeon roosts, as they were formerly called, frequently covering the forest for miles, and so often mentioned by naturalists

[1] Birds of North America, 1874, Vol. III, pp. 364, 365.

and hunters in former years, are, like the immense herds of the American bison which roamed over the great plains of the West in countless thousands but a couple of decades ago, things of the past, probably never to be seen again.

In fact, the extermination of the Passenger Pigeon has progressed so rapidly during the past twenty years that it looks now as if their total extermination might be accomplished within the present century. The only thing which retards their complete extinction is that it no longer pays to net these birds, they being too scarce for this now, at least in the more settled portions of the country, and also, perhaps, that from constant and unremitting persecution on their breeding grounds they have changed their habits somewhat, the majority no longer breeding in colonies, but scattering over the country and breeding in isolated pairs.

Mr. William Brewster, in his article "On the Present Status of the Wild Pigeon," etc., writes as follows: "In the spring of 1888 my friend, Captain Bendire, wrote me that he had received news from a correspondent in central Michigan to the effect that Wild Pigeons had arrived there in great numbers and were preparing to nest. Acting on this information, I started at once, in company with Mr. Jonathan Dwight, jr., to visit the expected 'nesting' and learn as much as possible about the habits of the breeding birds, as well as to secure specimens of their skins and eggs.

"On reaching Cadillac, Michigan, May 8, we found that large flocks of Pigeons had passed there late in April, while there were reports of similar flights from almost every county in the southern part of the State. Although most of the birds had passed on before our arrival, the professional Pigeon netters, confident that they would finally breed somewhere in the southern peninsula, were busily engaged getting their nets and other apparatus in order for an extensive campaign against the poor birds.

"We were assured that as soon as the breeding colony became established the fact would be known all over the State, and there would be no difficulty in ascertaining its precise location. Accordingly, we waited at Cadillac about two weeks, during which time we were in correspondence with netters in different parts of the region. No news came, however, and one by one the netters lost heart, until finally most of them agreed that the Pigeons had gone to the far north, beyond the reach of mail and telegraphic communication. As a last hope, we went, on May 15, to Oden, in the northern part of the southern peninsula, about 20 miles south of the Straits of Mackinac. Here we found that there had been, as elsewhere in Michigan, a heavy flight of birds in the latter part of April, but that all passed on. Thus our trip proved a failure as far as actually seeing a Pigeon 'nesting' was concerned; but partly by observation, partly by talking with the netters, farmers, sportsmen, and lumbermen, we obtained much information regarding the flight of 1888, and the larger nestings that have occurred in Michigan within the past decade, as well as many interesting details, some of which appear to be new about the habits of the birds.

"Our principal informant was Mr. S. S. Stevens, of Cadillac, a veteran Pigeon netter of large experience, and, as we were assured by everyone whom we asked concerning him, a man of high reputation for veracity and carefulness of statement. His testimony was as follows: 'Pigeons appeared that year in numbers near Cadillac, about the 20th of April. He saw fully sixty in one day, scattered about in beech woods near the head of Clam Lake, and on another occasion about one hundred drinking at the mouth of the brook, while a flock that covered at least 8 acres was observed by a friend, a perfectly reliable man, flying in a northeastly direction. Many other smaller flocks were reported.'

"The last nesting of any importance in Michigan was in 1881, a few miles west of Grand Traverse. It was only of moderate size, perhaps 8 miles long. Subsequently, in 1886, Mr. Stevens found about fifty dozen pairs nesting in a swamp near Lake City. He does not doubt that similar small colonies occur every year, besides scattered pairs. In fact, he sees a few Pigeons about Cadillac every summer, and in the early autumn young birds, barely able to fly, are often met with singly or in small parties in the woods. Such stragglers attract little attention, and no one attempts to net them, although many are shot.

"The largest nesting he ever visited was in 1876 or 1877. It began near Petosky, and extended northeast past Crooked Lake for 28 miles, averaging 3 or 4 miles wide. The birds arrived in two separate bodies, one directly from the south by land, the other following the east coast of Wisconsin, and crossing at Manitou Island. He saw the latter body come in from the lake at about 3 o'clock in the afternoon. It was a compact mass of Pigeons, at least 5 miles long by 1 mile wide. The birds began building when the snow was 12 inches deep in the woods, although the fields were bare at the time. So rapidly did the colony extend its boundaries that it soon passed literally over and around the place where he was netting, although when he began, this point was several miles from the nearest nest. Nestings usually start in deciduous woods, but during their progress the Pigeons do not skip any kind of trees they encounter. The Petosky nesting extended 8 miles through hardwood timber, then crossed a river bottom wooded with arborvitæ, and thence stretched through white pine woods about 20 miles. For the entire distance of 28 miles every tree of any size had more or less nests, and many trees were filled with them. None were lower than about 15 feet above the ground.

"Pigeons are very noisy when building, They make a sound resembling the croaking of wood frogs. Their combined clamor can be heard 4 or 5 miles away when the atmospheric conditions are favorable. Two eggs are usually laid, but many nests contain only one. Both birds incubate, the females between 2 o'clock p. m. and 9 or 10 o'clock the next morning; the males from 9 or 10 o'clock a. m. to 2 o'clock p. m. The males feed twice each day, namely, from daylight to about 8 o'clock a. m., and again late in

the afternoon. The females feed only during the forenoon. The change is made with great regularity as to time, all the males being on the nest by 10 o'clock a. m.

"During the morning and evening no females are ever caught by the netters; during the forenoon no males. The sitting bird does not leave the nest until the bill of its incoming mate nearly touches its tail, the former slipping off as the latter takes its place.

"Thus the eggs are constantly covered, and but few are ever thrown out despite the fragile character of the nests and the swaying of the trees in high winds. The old birds never feed in or near the nesting, leaving all the beechmast, etc., there for their young. Many of them go 100 miles each day for food. Mr. Stevens is satisfied that Pigeons continue laying and hatching during the entire summer. They do not, however, use the same nesting place a second time in one season, the entire colony always moving from 20 to 100 miles after the appearance of each brood of young. Mr. Stevens, as well as many of the other netters with whom we talked believes that they breed during their absence in the South in the winter, asserting as proof of this that young birds in considerable numbers often accompany the earlier spring flights. * * *

"Five weeks are consumed by a single nesting. Then the young are forced out of their nests by the old birds. Mr. Stevens has twice seen this done. One of the Pigeons, usually the male, pushes the young off the nest by force. The latter struggles and squeals precisely like a tame squab, but is finally crowded out along the branch, and after further feeble resistance flutters down to the ground. Three or four days elapse before it is able to fly well. Upon leaving the nest it is often fatter and heavier than the old birds; but it quickly becomes much thinner and lighter, despite the enormous quantity of food it consumes.

"On one occasion an immense flock of young birds became bewildered in a fog while crossing Crooked Lake, and descending struck the water and perished by thousands. The shore for miles was covered a foot or more deep with them. The old birds rose above the fog, and none were killed.

"At least five hundred men were engaged in netting Pigeons during the great Petosky nesting of 1881. Mr. Stevens thought that they may have captured on the average 20,000 birds apiece during the season. Sometimes two carloads were shipped south on the railroad each day. Nevertheless he believed that not one bird in a thousand was taken. Hawks and Owls often abound near the nesting. Owls can be heard hooting there all night long. The Cooper's Hawk often catches the stool pigeon. During the Petosky season Mr. Stevens lost twelve stool birds in this way.

"There has been much dispute among writers and observers, beginning with Audubon and Wilson, and extending down to the present day, as to whether the Wild Pigeon lays two eggs or one. I questioned Mr. Stevens closely on this point. He assured me that he had frequently found two eggs

or two young in the same nest, but that fully half the nests which he had examined contained only one.

"Our personal experience with the Pigeon in Michigan was as follows:

"During our stay at Cadillac we saw them daily, sometimes singly, usually in pairs, never more than two together. Nearly every large tract of old growth mixed woods seemed to contain at least one pair. They appeared to be settled for the season, and we were convinced that they were preparing to breed. In fact, the oviduct of a female, killed May 10, contained an egg nearly ready for the shell.

"At Oden we had a similar experience, although there were perhaps fewer Pigeons there than about Cadillac.

"On May 24, Mr. Dwight settled any possible question as to their breeding in scattered pairs, by finding a nest on which he distinctly saw a bird sitting. The following day I accompanied him to this nest, which was at least 50 feet above the ground, on the horizontal branch of a large hemlock, about 20 feet out from the trunk. As we approached the spot an adult male Pigeon started from a tree near that on which the nest was placed, and a moment later a young bird, with stub tail and barely able to fly, fluttered feebly after it. This young Pigeon was probably the bird seen the previous day on the nest, for on climbing to the latter, Mr. Dwight found it empty, but fouled with excrement, some of which was perfectly fresh. A thorough investigation of the surrounding woods, which were a hundred acres or more in extent, and composed chiefly of beeches, with a mixture of white pines and hemlocks of the largest size, convinced us that no other Pigeons were nesting in them.

"All the netters with whom we talked believe firmly that there are just as many Pigeons in the West as there ever were. They say the birds have been driven from Michigan and the adjoining States, partly by persecution, and partly by the destruction of the forests, and have retreated to uninhabited regions, perhaps north of the Great Lakes in British North America. Doubtless there is some truth in this theory; for, that the Pigeon is not, as has been asserted so often recently, on the verge of extinction, is shown by the flight which passed through Michigan in the spring of 1888. This flight, according to the testimony of many reliable observers, was a large one, and the birds must have formed a nesting of considerable extent in some region so remote that no news of its presence reached the ears of the vigilant netters. Thus it is probable that enough Pigeons are left to restock the West, provided that laws sufficiently stringent to give them fair protection be at once enacted. The present laws of Michigan and Wisconsin are simply worse than useless, for, while they prohibit disturbing the birds *within* the nesting, they allow unlimited netting only a few miles beyond its outskirts *during the entire breeding season.* The theory is, that they are so infinitely numerous that their ranks are not seriously thinned by catching a few millions of breeding birds in a summer, and that the only danger to be guarded against is that of frightening them away by the use of guns or nets in the

woods where their nests are placed. The absurdity of such reasoning is self-evident, but, singularly enough, the netters, many of whom struck me as intelligent and honest men, seem really to believe in it. As they have more or less local influence, and, in addition, the powerful backing of the large game dealers in the cities, it is not likely that any really effectual laws can be passed until the last of our Passenger Pigeons are preparing to follow the Great Auk and the American bison."[1]

In order to show a little more clearly the immense destruction of the Passenger Pigeon *in a single year and at one roost* only, I quote the following extract from an interesting article "On the habits, methods of capture, and nesting of the Wild Pigeon," with an account of the Michigan nesting of 1878, by Prof. H. B. Roney, in the Chicago Field (Vol. x, pp. 345–347):

"The nesting area, situated near Petosky, covered something like 100,000 acres of land, and included not less than 150,000 acres within its limits, being in length about 40 miles by 3 to 10 in width. The number of dead birds sent by rail was estimated at 12,500 daily, or 1,500,000 for the summer, besides 80,352 live birds; an equal number was sent by water. We have," says the writer, "adding the thousands of dead and wounded ones not secured, and the myriads of squabs left dead in the nest, at the lowest possible estimate, a grand total of 1,000,000,000 Pigeons sacrificed to Mammon during the nesting of 1878."

The last-mentioned figure is undoubtedly far above the actual number killed during that or any other year, but even granting that but a million were killed at this roost, the slaughter is enormous enough, and it is not strange that the number of these Pigeons are now few compared with former years.

Capt. B. F. Goss, of Peewaukee, Wisconsin, writes me: "Ten years ago the Wild Pigeon bred in great roosts in the northern parts of Wisconsin, and it also bred singly in this vicinity; up to six or eight years ago they were plenty. The nest was a small rough platform of twigs, from 10 to 15 feet from the ground. I have often found two eggs in a nest, but one is by far the most common. These single nests have been thought by some accidental, but for years they bred in this manner all over the county, as plentifully as any of our birds. I also found them breeding singly in Iowa. These single nests have not attracted attention like the great roosts, but I think it is a common manner of building with this species."

Mr. Frank J. Thompson, in charge of the Zoölogical Gardens at Cincinnati, Ohio, gives the following account of the breeding of the Wild Pigeon in confinement: "During the spring of 1877, the society purchased three pairs of trapped birds, which were placed in one of the outer aviaries. Early in March, 1878, I noticed that they were mating, and procuring some twigs, I wove three rough platforms, and fastened them up in convenient places, at the same time throwing a further supply of building material on the floor. Within twenty-four hours two of the platforms were selected; the male car-

[1] Auk, Vol. VI, 1889, pp. 285, 291.

rying the material, whilst the female busied herself in placing it. A single egg was soon laid in each nest and incubation commenced. On March 16, there was quite a heavy fall of snow, and on the next morning I was unable to see the birds on their nests on account of the accumulation of the snow piled on the platforms around them. Within a couple of days it had all disappeared, and for the next four or five nights a self-registering thermometer, hanging in the aviary, marked from 14° to 19°. In spite of these drawbacks both of the eggs were hatched and the young ones reared. They have since continued to breed regularly, and now I have twenty birds, having lost several eggs from falling through their illy-contrived nests and one old male."[1]

The Passenger Pigeon has been found nesting in Wisconsin and Iowa during the first week in April, and as late as June 5 and 12 in Connecticut and Minnesota. Their food consists of beechnuts, acorns, wild cherries, and berries of various kinds, as well as different kinds of grain. They are said to be very fond of, and feed extensively on, angle worms, vast numbers of which frequently come to the surface after heavy rains, also on hairless caterpillars.

Their movements, at all seasons, seem to be very irregular, and are greatly affected by the food supply. They may be exceedingly common at one point one year, and almost entirely wanting the next. They generally winter south of latitude 36°.

Their notes during the mating season are said to be a short "coo-coo," and the ordinary call note is a "kee-kee-kee," the first syllable being louder and the last fainter than the middle one.

Opinions differ as to the number of broods in a season; while the majority of observers assert that but one, a few others say that two, are usually raised. The eggs vary in number from one to two in a set, and incubation lasts from eighteen to twenty days, both sexes assisting. These eggs are pure white in color, slightly glossy, and usually elliptical oval in shape; some may be called broad elliptical oval.

The average measurements of twenty specimens in the U. S. National Museum collection is 37.5 by 26.5 millimetres. The largest egg measures 39.5 by 28.5, the smallest 33.5 by 26 millimetres.

The type specimen figured (No. 18544, Pl. 4, Fig. 6), was taken from the oviduct of a bird, in May, 1882, by Messrs. H. T. Phillips & Co., Detroit, Michigan.

[1] Bulletin Nuttall Ornithological Club, Vol. VI, 1881, p. 122.

## 47. Zenaidura macroura (Linnæus).

MOURNING DOVE.

*Columba macroura* Linnæus, Systema Naturæ, ed. 10, 1758, 164 (part).
*Zenaidura macroura*, Ridgway, Proceedings U. S. National Museum, VIII, 1885, 355. (B 451, C 371, R 460, C 544, U 316).

Geographical range: Whole of temperate North America; north to Canada, southern Maine and British Columbia; south to Panama and West Indies.

The breeding range of the Mourning Dove, also called the "Carolina" and "Turtle" Dove, extends over the entire United States, from Florida and the Gulf of Mexico to the Canadian border, and from the Atlantic seaboard to the Pacific Ocean.

It is only a summer visitor in the northern portions of its range, and occurs sparingly during this season in southern Canada, and more frequently in Manitoba. On the Pacific coast it is not uncommon on Vancouver Island, and it extends well into the interior of British Columbia. I have personally met with it in considerable numbers, both in northern Washington and northern Idaho.

It winters, and is a constant resident throughout the year, in nearly all the Southern States. Mr. W. W. Cooke states: "From latitude 36° southward, this Dove can be found regularly and abundantly throughout the year. Between latitude 36° and 38° it is a regular but not an abundant winter resident, occurring in flocks. North of latitude 38°, although many are found each winter, they are merely single birds that have found exceptionally favorable quarters."[1]

The Mourning Dove is a well-known bird, tame and gentle when not molested, frequently breeding in the gardens and shrubbery near dwelling houses, and often feeding in the barnyard amongst domestic fowls. They never occur in such large flocks as the Passenger Pigeon, but are usually found in small parties of from six to a dozen or more, and in the late fall, previous to their migration, I have often flushed fifty and upward from a favorite feeding ground. They like to alight in roads, where they may often be seen traveling along in search of suitable food or gravel, or for the purpose of taking a dust bath, of which they are very fond.

In the more arid portions of the West, especially in southern Arizona, I have often noticed this Dove a long way from water, but as they are exceedingly strong and rapid flyers, distance is but a trifling matter to them. They usually visit their regular watering places in the morning, and in the evening just before sundown, and, where water holes or springs are scarce, they can be seen coming from all directions in search of such localities, usually in pairs or little parties of from four to six. At this time, if closely watched, they are a sure guide to water; old mountaineers are well aware

[1] Bulletin II, Department of Agriculture, Report on Bird Migration in the Mississippi Valley, p. 109.

of this fact, and, if not familiar with the country, they shape their course after the line of travel of these Doves, which is always a direct and straight route to the objective point.

The mating season begins early in March in the southern portions of their range, and later northward. Fresh eggs have been found by Mr. George E. Beyer, near New Orleans, Louisiana, on March 30; and I have taken perfectly fresh specimens as late as September 14, and might probably have found them still later had I looked for them at my camp on Rillitto Creek, near Tucson, Arizona.

Their peculiar love notes are well known to most observers, and can be frequently heard in the early spring wherever these birds are found, being a sound of three syllables in the beginning, like "cŏŏ, cŏŏ, rŏŏ," and ending with four and five, with slight variations like "Mŏŏ, ŏă, ŏŏŏ, ŏŏŏ, ŏŏŏ." These notes are guttural and difficult to describe exactly. It is a low, mournful, but nevertheless far-penetrating note, though the actions of the male while uttering them seem cheerful and lively enough. He pays devoted court to his mate at all times, and I am inclined to the belief that many remain paired throughout the year, as single pairs may be seen in winter as well as summer.

The nesting season begins about the middle of March in Florida and other Southern States, and from three to four weeks later in the more northern portions of its range.

The nesting sites of this species are exceedingly variable. Usually the slender and frail platform of twigs, which answers the purpose of a nest, is placed on some flat spreading limb of a tree, at a height of from 10 to 20 feet from the ground, no especial preference being shown for any particular kind, unless perhaps, the evergreens, such as small cedars, junipers, and pines. Various sorts of bushes are also used; in fact, nests may be found at a height of only a few inches from the ground and again 50 and more feet up. In the Carolinas, Dr. Elliott Coues states, in his "Birds of the Northwest," that they nest chiefly on the ground. Personally I have more than once found the eggs of this species lying on the bare ground under the shelter of some little bush, and usually close to a creek, both in Washington and Idaho, but the majority of these birds nested there in willow thickets. At Fort Custer, Montana, I found their nests on flat sticks of cordwood in woodpiles; and in Arizona they often lay on a cottonwood stump. I found a nest of the Mourning Dove on top of an abandoned and broken down Magpie's nest, near Camp Harney, Oregon; in fact, they use all sorts of strange sites, flat tops of bowlders, ledges of cliffs, old nests of other species on top of which a slight platform of sticks is built, etc. In the more open prairie regions of the Western States they probably breed as frequently on the ground as above it, but in Arizona, although I noticed many of their nests, none were found on the ground, no doubt due to the many reptiles inhabiting that country. Here they usually selected the thick shrubbery found along water courses, and again, in some localities they were quite partial to the thorny mesquite and catsclaw bushes, and even to the ever-present cholla cactus.

Strange and unusual nesting sites are rather common with this species, and I will mention a few of them:

Mr. Lynds Jones found a Mourning Dove's nest on top of a straw shed, and another beneath a shed roof. Mr. R. B. McLaughlin reports one found in an old nest of a Green Heron, and another in a cavity of a tree. He writes me as follows: "The excavation had been made by Woodpeckers, and did not extend downward for more than an inch or so, but had been dug almost straight in. This made a nice foundation upon which the nest was built. The site was all that was peculiar about it."

This Dove will occasionally lay its eggs in nests occupied by other species, and one of the strangest combinations of this kind is thus described in Forest and Stream, September, 1889, by Mr. J. L. Davidson, in his "Birds of Niagara County, New York;" he says: "June 17, 1882, I found a Black-billed Cuckoo and a Mourning Dove sitting together on a Robin's nest. The Cuckoo was the first to leave the nest. On securing the nest I found it contained two eggs of the Cuckoo, two of the Mourning Dove, and one Robin's egg. The Robin had not quite finished the nest when the Cuckoo took possession of it and filled it nearly full of rootlets, but the Robin got in and laid one egg. Incubation had commenced in the Robin's and Cuckoo's eggs, but not in those of the Mourning Dove. I have the nest and eggs in my collection. This was first published under the head of 'A strange story' (Forest and Stream, August 24, 1882, p. 65)."

Mr. Whitmer Stone writes me: "In Lancaster County, Pennsylvania, where this species breeds extensively in orchards, I have found them building a thin platform of sticks on top of old nests of the American Robin, *Merula migratoria*, and the King Bird, *Tyrannus tyrannus*, and once in August I found a Dove sitting on two eggs, which were deposited in a Robin's nest from which the young birds had departed a month before. Fragments of the shells of the Robin's eggs were still to be seen in the bottom of the nest, and the Doves did not seem to have done anything at all in the way of building."

That they are hardy birds is well attested by Mr. J. W. Preston, of Baxter, Iowa, who writes me as follows: "A few remain here during winter, and are seen about stockyards, where they come from the woods to feed. Five are with me this winter, 1890, and are doing well, though they were a pitiful sight when the snow was 16 inches deep, and the mercury fell 20° below zero. Our Doves have a habit of repairing to some dry ditch to roost. Hundreds will flock to some chosen rendezvous, and they are very regular in their movements. This seems to occur in the more sparsely timbered regions, in the autumn."

Their food consists of small seeds, the various kinds of grain, berries, beechnuts, small acorns, wild pease, and the tender tops of plants, worms and insects of different kinds. Mr. C. S. Brimley, of Raleigh, North Carolina, accuses this species of pulling up the sprouting corn; and he says that it also does great damage to the early pease in the trucking districts. In Florida,

according to Dr. William L. Ralph, they are very partial to feeding on grounds recently burnt over.

Incubation, in which both sexes assist, is said to last about two weeks. Two, and possibly three, broods are reared in a season. The nests are frail affairs, simply slight platforms of small sticks or twigs, very shallow, sometimes lined with bits of dry grass, a few leaves, Spanish moss, or pine needles, whichever is most convenient to the nesting site, and sometimes they are without any lining whatever, so that the eggs can readily be seen through the bottom of the nest. The nest, frail as it may often be, requires, nevertheless, considerable labor to construct, as this Dove, like most of the members of this family, is a poor nest builder; and, as far as my observations go, this seems to be done entirely by the female, the male looking on and cooing most of the time, but not assisting its mate in any way. On the ground there is even less of an attempt at making a nest, and I have seen the eggs lying in a slight hollow on the bare ground, not even surrounded by a few sticks or grass.

Mr. R. B. McLaughlin says: "Like other species which never lay more than two eggs, the Mourning Dove skips one day in the laying of its eggs; that is, if it lays the first one to-day it will not lay to-morrow, but the day after the second egg will be deposited."

The eggs are usually two in number, sometimes only one. Occasionally three, and even four, have been found in a nest, presumably laid by different birds. Mr. F. Stephens found a nest containing three eggs, on April 13, 1879. In two of these eggs incubation had commenced, the third was fresh.

Mr. Lynds Jones found a set of four near Grinnell, Iowa, and thinks they were all laid by one bird. He further states: "These Doves are very loving all through the year, and both parents are very attentive to their young, even long after they leave the nest. I have often found the female covering fully fledged young, always sitting crosswise of them. The young nestlings are fed on cutworms and other worms, as well as bugs; later they feed on grain and small seeds. If the sitting bird be flushed, she will tumble from the nest with piteous cries and in a very dilapidated condition. The male is always near by. The young grow very rapidly, and leave the nest early. In this locality nests on the prairie contain eggs fully two weeks earlier than nests in the woods."

The eggs of the Mourning Dove vary considerably in shape as well as in size. The majority may be called elliptical oval, others are elliptical ovate, and a few oval. They are pure white in color; the shell is smooth and moderately glossy. The average measurement of seventy-nine specimens in the U. S. National Museum collection, is 28 by 21 millimetres. The largest egg in this series measures 30.5 by 22.5, the smallest 25 by 19.5 millimetres.

Of the type specimens, No. 20818 (Pl. 4, Fig. 8), from the Merrill collection, was taken by Asst. Surg. James C. Merrill, U. S. Army, near Fort Brown, Texas, on June 8, 1876; and No. 20796 (Pl. 4, Fig. 9), from the Bendire collection, was taken May 26, 1872, by the writer, near Tucson, Arizona.

## 48. Zenaida zenaida (Bonaparte).

ZENAIDA DOVE.

*Columba zenaida* Bonaparte, Journal Academy Natural Sciences, Phila., v, 1825, 30.
*Zenaida zenaida* Ridgway, Proceedings U. S. National Museum, viii, 1885, 355.
(B 449, C 372, R 462, C 545, U 317.)

Geographical range: Florida Keys, Bahamas, Cuba, Jamaica, Porto Rico, Santa Cruz, Sombrero, and coast of Yucatan.

The breeding range of the Zenaida Dove within our borders is restricted to the southern Florida Keys, where it seems to be an irregular visitor. According to Audubon "they made their appearance among the islands at Indian Key about the 15th of April, where they remained until October, returning then to the West India Islands whence they came and where they are most numerous.

"They breed on the few keys that are covered with grass and low shrubs. They always place their nest on the ground, often with so little concealment that it may be easily discovered by any one searching for it. Occasionally it is placed between tufts of grass, the tops of which bend over and conceal it. A small hole is scooped in the sand, in which a slight nest, composed of matted blades of dry grasses, is placed, circular in form, and embedded in an outer collection of dry leaves and twigs. The whole fabric is said to be more compact than the nest of any other Pigeon."[1]

Mr. Charles B. Cory, in "Birds of the Bahama Islands" (p. 139), says: "This beautiful Dove is found throughout the Bahamas, but does not appear to be very abundant. It seems to be rather solitary in its habits, and is never met with in flocks. The nest is composed of small sticks loosely put together. On May 27 I procured a nest which was placed in the crotch of a fallen tree about 3 feet from the ground. It contained two white eggs."

Dr. Henry Bryant, in the "Proceedings of the Boston Society of Natural History, for 1859," (p. 120), makes the following statement about this species: "The Zenaida Dove, though more seldom seen in the Bahama Islands than the White-crowned Pigeon, *Columba leucocephala*, is still by no means rare. It never collects in flocks, and does not breed in communities like the former. In its habits it is intermediate between the *Z. carolinensis* and the *C. passerina*. It feeds and passes the principal part of its time on the ground, and when flushed, flies off in a straight line, very much as the common Quail. The crops of those killed by me were filled with small seeds, about the size of a mustard seed, apparently all of the same kind. All the nests I saw were made in holes in the rocks, and consisted, as is always the case in this family, of but a few sticks."

From these accounts it will be seen that the Zenaida Dove differs considerably in its nesting habits in certain localities. According to Mr. W. T.

[1] Birds of North America, 1874, Vol. III, pp. 379, 380.

March, who found this species breeding near the Salt Ponds, Spanishtown, Jamaica, in May, 1863, it nests indiscriminately on the ground or in trees, making a slight platform of sticks and twigs loosely put together. It breeds from April to the end of July, and probably raises two broods a season.

None of the more recent explorers seem to have met with this species on the Florida Keys, and if found there at all now, it must be considered as rather rare.

I can add nothing new to these accounts. The eggs are two in number, pure white in color, oval in shape, and more rounded than Pigeon eggs generally are.

The average measurement of eleven eggs of this species in the U. S. National Museum collection, is 31 by 23.5 millimetres. The largest measures 34 by 23, the smallest 29 by 22.5 millimetres. None of these eggs were collected within the limits of the United States.

The type specimen (No. 6140, Pl. 2, Fig. 21) was collected near Spanishtown, Jamaica, by Mr. W. T. March, in May, 1863.

## 49. Engyptila albifrons (Bonaparte).

WHITE-FRONTED DOVE.

*Leptoptila albifrons* Bonaparte, Conspectus Avium, II, December, 1854, 74.
*Engyptila albifrons* Coues, Bulletin Nuttall Ornithological Club, v, April, 1880, 100.
(B —, C —, R 463, C 542, U 318.)

Geographical range: Valley of the Lower Rio Grande in Texas, and southward to Mexico and Guatemala.

The breeding range of the White-fronted Dove within the limits of the United States, as at present known, is confined to the Lower Rio Grande Valley, Texas, where Mr. George C. Sennett obtained the first specimen found within our border, on April 18, 1877, in a tract of timber near the bank of the Rio Grande, a mile below Hidalgo, Texas. In his "Further Notes on the Ornithology of the Lower Rio Grande of Texas," he writes as follows about this species: "Dr. Finley reports the arrival of this Pigeon at the vicinity of Hidalgo and Lomita about the middle of February, its departure having taken place in November. Although it is less numerous than the Red-billed Pigeon, yet by its peculiar note is is easily distinguished from all other species, and can thus be readily obtained. We heard it daily. It is so much more retiring in its habits than other Pigeons, that, were it not for the peculiarity we mention, it would be met with very seldom. It frequents the dense and heavy growth of timber, and long and frequent were our endeavors to find its nest."[1]

A nest was finally found by a Mexican assistant of Mr. Sennett's, in some dense shrubbery in the river bottom, containing two eggs. The parent was also shot at the same time. The two eggs obtained enabled him to identify two

[1] U. S. Geological and Geographical Survey, Hayden, Vol. v, No. 3, p. 424.

others that were brought in with a lot of White-winged Dove's eggs. The nest was situated in the forks of a bush about 5 feet from the ground, was flat and quite large for a Pigeon's nest, and composed of the dead branches, twigs, and bark of pithy weeds.

Dr. J. C. Merrill, assistant surgeon U. S. Army, while stationed at Fort Brown, Texas, met with this Pigeon there. He says: "It is not rare in the vicinity of Fort Brown, but is shy and not often seen. The only nest I have found was taken June 8, 1878, on the Government reservation. It was about 7 feet from the ground, supported by the dense interlacing tendrils of a hanging vine growing on the edge of a thicket."[1]

Mr. William Lloyd writes me that this Pigeon breeds abundantly in the Sierra Madre, from southern Chihuahua to Beltran, Jalisco, Mexico, at an altitude of from 1,100 to 2,200 feet. The nests, usually placed in thorny shrubs. *Huisache, Acacia farnesiana* 10 to 12 feet from the ground, are substantially made of straw. He found eggs as early as May 10, and up to June 13, when they were much incubated. It frequents deep arroyas mostly during the breeding season. They are only summer residents in northern Mexico, migrate in pairs, and feed principally on fruits. The eggs of this species are elliptical oval in shape; their color is cream-buff, and the shell is smooth and glossy.

The only specimens in the U. S. National Museum collection, are the two taken by Dr. James C. Merrill, U. S. Army, near Fort Brown, Texas, on June 8, 1878, referred to previously. These measure 31 by 23, and 30 by 22.5 millimetres. One of these, No. 20830, is figured on Pl. 2, Fig. 22.

## 50. Melopelia leucoptera (Linnæus).

WHITE-WINGED DOVE.

*Columba leucoptera* Linnæus, Systema Naturæ, ed. 10, I, 1758, 164.
*Melopelia leucoptera* Bonaparte, Conspectus Avium, II, December, 1854, 81.
(B 450, C 373, R 464, C 546, U 319.)

Geographical range: Mexico, south to Costa Rica; north to southern border of United States (Florida and Texas to Arizona); Lower California, Cuba, Jamaica.

Within the borders of the United States the breeding range of the White-winged Dove is confined to the southwestern parts of our domain, including Arizona and New Mexico, as well as western and southwestern Texas, as far as known at present. Stragglers have also been observed in southern Colorado and at Key West, Florida, and it probably occurs at other points of the Gulf coast, and may possibly breed there also. It is one of the most common birds in Southern Arizona, and found there at altitudes up to about 4,000 feet, seldom higher.

According to my observations, it is equally as abundant in the foothills of the mountains as in the lower and hot valleys of the San Pedro, the Santa Cruz, the Gila, Verde, and Salt Rivers. It is partial to certain localities,

[1] Proceedings U. S. National Museum, Vol. I, 1878, p. 158.

and in such they may be quite common, while in others, apparently as well suited, they are, for some reason comparatively rare, or entirely wanting. I found the White-winged Dove fairly common in 1872 in the foothills of the Santa Catalina Mountains and among the undergrowth bordering the Rillitto Creek, the present site of Fort Lowell, Arizona.

Both Mr. George B. Sennett, and Asst. Surg. James C. Merrill, U. S. Army, report this species as exceedingly abundant in the Lower Rio Grande Valley in Texas.

In the vicinity of Tucson, Arizona, it is partially resident throughout the year. I have observed specimens during every month of the winter of 1872 and 1873, but they are not as abundant then as in the summer. The conspicuous white wing-patch easily distinguishes this bird from any of the other Doves found in that region.

The mating season begins early, usually about the middle of March, and the cooing and love-making of the male can be heard and seen almost any day during a stroll among the shrubbery found along the borders of the water courses, which seem to be favorite resorts for many of these birds.

Their call notes are varied, much more so than those of any other species of this family found with us; they are sonorous, pleasing, and rather musical. On this account the natives keep many of them as cage birds, calling them *Páloma cantador*, Singing Dove. They soon become very gentle and reconciled to captivity, feeding readily out of one's hand and allowing themselves to be handled without fear.

One of their most characteristic call notes bears a close resemblance to the first efforts of a young Cockerel when attempting to crow, and this call is frequently uttered and in various keys. While thus engaged the performer usually throws his wings upward and forward above the head and also spreads his tail slightly. Some other notes may be translated into "cook for you," or "cook for two," "cook-kara-coo," besides a variety of calls, one of these a querulous harsh one, resembles somewhat the syllables "chàà-hää."

Mr. Herbert Brown, of Tucson, Arizona, writes me: "There are but few of these Doves found in the immediate vicinity of Tucson, but they are numerous all over the country generally. They are not particularly partial to open mesas or bottom lands as a rule, but confine themselves largely to the rough and rocky foothills, covered with the sahuara cactus and palo verde bushes. I first met with this species at New River, on the Black Cañon road, about 135 miles north of this place, and I consider this point their northernmost limit in this Territory. There I met with them for the first time, fourteen years ago. What particularly drew my attention to them at the time was their call, which so much resembled the crow of a young rooster, that I remarked to my companion, 'We must be in the neighborhood of a ranch;' and it was only when I saw the bird in the act of doing the barnyard honors that I learned my mistake. I have seen many of their nests and eggs but never disturbed them. A few years ago I found about a dozen of their nests in almost as many minutes.

They were all placed in a little mesquite grove between a couple of volcanic hills west of town."

Nidification usually begins in the latter part of April in southern Arizona, and sometimes later. The nests of the White-winged Dove, like those of most of the members of this family, are as a rule rather frail structures, consisting of a slight platform of small sticks and twigs interlaced with each other, and lined more or less with bits of old weeds, stems of mesquite leaves, and dry grasses. Mr. G. B. Sennett found a nest of this species made of Spanish moss. No particular preference seems to be shown for certain trees. I have found many of my nests in mesquite trees, the most abundant in that locality; others were placed in walnut trees, willows, and cholla cactus, at various heights from the ground, from 2½ up to 30 feet.

I found my first nest on May 15, 1872. This was placed on a live mesquite stump from the top of which a number of green sprouts had grown out, the nest being only 2½ feet from the ground, the lowest situation in which I found any. It contained two fresh eggs. A second nest, found May 24, was placed on a horizontal limb of a mesquite tree, 6 feet from the ground. A third I found on a walnut tree close to the trunk, among some young sprouts. It was fully 20 feet from the ground. An occasional nest is placed in cacti, but the majority in trees.

As stated above I found, my first nest of this species on May 15, and my last, the fourteenth, on June 24. Although I searched carefully for others during the next three months, when both *Zenaidura macroura* and *Columbigallina passerina pallescens* were still laying, I failed to find a single nest of the White-winged Dove with eggs after that date.

Dr. J. C. Merrill, U. S. Army, took eggs of this species near Fort Brown, Texas, up to July 3.

I believe but one brood is usually raised in a season. As near as I can judge, incubation lasts about eighteen days. The male relieves the female somewhat in these duties, but does not assist to any great extent; he, however, assiduously helps to care for the young.

Their food consists of insects, small seeds, grain, if procurable, berries, mesquite beans, and the fruit of the sahuara cactus, *Cereus giganteus*, which seems to be a favorite article of food with many birds in Arizona.

In the late summer these birds collect in small parties, and I found them not at all shy. I have frequently seen as many as a dozen feeding among the cavalry horses along the picket line in my camp, allowing the men to walk within 10 feet of them without flying off.

The eggs are generally two in number, seldom one. They are mostly elliptical oval in shape, that is, equally rounded at each end; a few may be called oval. Their color is a rich creamy tint when fresh, and readily perceptible then, but in many specimens, especially in such as were considerably advanced in incubation when taken, this delicate tint fades, in time leaving the egg a dull dead white.

The average measurement of seventy-four specimens in the U. S. National Museum collection, is 30.5 by 23 millimetres. The largest egg measures 34 by 24, the smallest 28 by 19.5 millimetres. The type specimen (No. 20822, of the Merrill collection, from a set of two, Pl. 2, Fig. 23) was collected, near Edinburgh, Texas, by Asst. Surg. J. C. Merrill, U. S. Army, May 16, 1876.

## 51. Columbigallina passerina (Linnæus).

GROUND DOVE.

*Columba passerina* Linnæus, Systema Naturæ, ed. 10, I, 1758, 165.
*Columbigallina passerina* Zeledon, Proceedings U. S. National Museum, VIII, 1885, 112.
(B 453, C 374, R 465, C 547. U 320,)

Geographical range: West India Islands; north to southern Atlantic and Gulf States excepting Texas (casually to District of Columbia).

The little Ground Dove breeds abundantly throughout the southern Atlantic and Gulf States, from South Carolina, south, through Georgia, Alabama, Florida, and southern Louisiana, being much more abundant in the immediate vicinity of the coast than in the interior.

Dr. William L. Ralph, who is familiar with this species, writes me as follows about it: "Few of the birds I am acquainted with have so much interested me as these little Doves. They are very tame, and seem to delight in frequenting the vicinity of houses, often building their nests within a few feet of the ground, near places where people are constantly passing. In Florida they are particularly fond of resorting to orange groves, both for nesting and feeding. In other localities they prefer fields in the vicinity of woods, with very little undergrowth.

"Their nests, which are usually larger in proportion and more compactly built than is common with birds of this family, are composed of twigs, weeds, dead leaves, pine needles, Spanish moss, etc., and lined with fine grass or some similar material. They are generally placed on a horizontal branch of a tree, preferably an orange tree, from 5 to 25 feet above the ground, most of them being under 10 feet. I have not infrequently found them in bushes or vines, and occasionally on the ground, but I believe the latter situation is not at all common.

"I have found these birds nesting at all times between the 1st of March and the 1st of June, but they do not begin breeding in any numbers before the middle of April. The earliest and latest dates of sets of my own collecting, now at hand, are March 21 and May 7. In all probability these birds nest several times during the season, but I have no personal knowledge of their breeding more than twice, as I never remained in Florida after the 1st of June.

"Both parents assist in incubation, and show a great deal of concern in the care of their homes. When one is driven from a nest containing eggs, it will

drop to the ground as if shot, and will then flutter around as if wounded, to try to draw the person disturbing it away from the nest, but, whether it succeeds or not, it will soon fly off. When a nest contains young, however, the bird will become almost frantic with anxiety, and will tumble around until it appears to be nearly exhausted. I have often refrained from taking nests that I have wanted, on account of the evident distress of the parent birds.

"These Doves seem to dislike being alone, and go about in small flocks even during the breeding season. They are constant residents of Florida, and ten or fifteen years ago I found them abundant throughout the northern and central parts of the State. In the locality where these notes were taken they are still common, though fast decreasing in numbers, owing principally to the causes that are fast exterminating most Florida birds, viz, plume hunters and tourists.

"Their notes are very much like those of the Mourning Dove, and during the mating and breeding seasons, they will frequently sit for an hour or more at a time on the roof of some building, or in a tree, uttering their mournful calls. For birds so small they make a great deal of noise when they fly, but their wings do not produce a whistling sound like those of the Mourning Dove. Their food consists of seeds, grain, etc., and where they can get them, they will eat green pease."

Mr. T. D. Perry, of Savannah, Georgia, states: "The breeding season of the Ground Dove covers a long period, commencing, as it does, early in April and continuing through June and sometimes July. I have found their nests as early as April 9, with eggs slightly incubated, and as late as July 9, with fresh eggs. The nest is a very slight affair, consisting of a few twigs and pine needles, and very often grass and pine needles. The birds seem to have no regular place for their location. In one instance I found a nest on the ground, and in another case one on a stump. Generally, however, it is located in vines, or in a pine sapling or a myrtle bush. The height from the ground varies from 2 to 6 feet in most instances, though I once found a nest that was 10 feet up, and another that was 20 feet from the ground. They seem to prefer the pine lands, where the undergrowth of young saplings make the woods dense, and here their nests are generally found."[1]

Since Mr. Perry wrote the above he informs me that sets of eggs of this species have been found near Savannah, Georgia, as early as March 13 and 17, and Mr. Arthur T. Wayne records taking a set of eggs of the Ground Dove near Charleston, South Carolina, containing small embryos, on October 19, 1886, securing the male while incubating.[2]

Incubation is said to last two weeks, both parents assisting. Two broods, occasionally three, and, in exceptional cases, even four are raised in a season.

The eggs of the Ground Dove are usually two in number, pure white in color, and most commonly elliptical oval in shape; a few are oval, and some elliptical ovate (slightly pointed at one end).

[1] Ornithologist and Oölogist, Vol. XII, 1887, p. 102. [2] Ibid., p. 7.

The average measurement of forty-three eggs of this species in the U. S National Museum collection, is 21.5 by 16.5 millimetres. The largest egg in the series measures 24 by 17.5, the smallest 19 by 14.5 millimetres. No specimen is figured, as they are indistinguishable from the egg of the subspecies following, of which one is represented.

## 52. Columbigallina passerina pallescens (Baird).

MEXICAN GROUND DOVE.

*Columbigallina passerina pallescens* Ridgway, Manual North American Birds, 1887, p. 586, Appendix.
(B 453, part; C 374, part; R 465, part; C 547, part; U 320*a*.)

Geographical range: Southwestern United States; Texas to Arizona and Lower California; south through Mexico (both coasts) to Central America.

The breeding range of the Mexican Ground Dove within our borders is confined to southwestern Texas and southern Arizona, and probably to southern New Mexico, although there are as yet no records of its breeding in the latter Territory, as far as I am aware. A few stragglers breed probably also in southern California, where it has been taken on several occasions. It is quite common in Lower California, where Mr. J. Xantus took its eggs near Cape St. Lucas, and Mr. L. Belding at San José del Carbo.

Dr. James C. Merrill, U. S. Army, found this subspecies abundant in the vicinity of Fort Brown, Texas, particularly during the summer. Several sets of eggs collected by him while stationed at this post are in the U. S. National Museum collection. He says: "The small and rather compact nests are placed on the horizontal branch of a stout bush or tree, and are lined with a few straws. On one occasion I found the eggs in a roughly made nest on the ground on the edge of a prairie."[1]

It was also noticed by Mr. G. B. Sennett at Hidalgo, Texas, and they breed all along the Lower Rio Grande.

Mr. William Lloyd writes me that he found the Mexican Ground Dove nesting between April 8 and June 1, sometimes under a bush or on an open hillside, and again on a limb or in a fork of a tree from 3 to 8 feet from the ground. These birds are often found in the streets of towns, and especially in corrals where horses and cattle are kept, ranging from sea level to an altitude of 9,000 feet, in Mexico. They are usually seen in flocks from ten to twelve, and feed on small grain and seeds. He gives their call note as "pas-cual, pas-cual, pas-cual."

According to Mr. Herbert Brown, the Mexican Ground Dove is common about Tucson. He says: "In the fall, when the weeds and grass seeds are ripe, I have seen as many as fifty of these birds in a flock; during the winter months but few are seen, and then only in pairs.

[1] Proceedings U. S. National Museum, Vol. I, 1878, p. 158.

"They lay two eggs, and nest in trees or bushes. A nest found June 11, 1887, was constructed of a few dead twigs and grass placed on a limb of a willow near the ground; the female was on the nest. One found June 19 was also in a willow tree 20 feet from the ground and out on a limb 15 feet from the body of the tree, and made of a few dried stalks of alfalfa. It contained two eggs and the female was on the nest. A third nest, found June 26, containing two eggs, was made of long stems of dry grass and placed about 10 feet from the ground. Whether this was a first laying, I cannot say. The nests are almost flat. I do not think I ever saw a cavity more than half an inch deep."

I found this subspecies a resident, during the entire year, at my camp on Rillitto Creek, near Tucson, in 1872 and 1873. In the winter they became exceedingly tame, and I have seen them frequently alight within a few feet of my tent, picking up bread crumbs which I threw to them. They are lovely and affectionate little birds, their call notes and cooing, however, have rather a doleful sound. My picket line was always a favorite resort for them, as well as for other species, particularly during the winter, when from six to ten Doves might be seen almost any time of the day feeding on the scattered grain left by the horses. I am inclined to believe that they remain paired for life.

Love-making begins about the first week in April, but although I searched carefully for their nests I failed to find any till May 30. From this date until the middle of September I examined a number. All of the nests seen by me were placed on bushes or on trees, from 3 to 21 feet off the ground, not a single one was found on the ground.

The first one found, on May 30, was placed in a syringa bush, about 3 feet from the ground. The little platform of small twigs and grass stems was very slight, about 4½ inches in diameter, and almost perfectly flat. The eggs were fresh.

Other nests, subsequently noticed, were placed in various trees and bushes, mostly in mesquite thickets, a few in willows, and two in walnut trees. A nest found July 28 was placed in a tree of this kind, about 20 feet from the ground. The tree was leaning, and some young sprouts had grown out from the main trunk, among which the nest was placed. The eggs were fresh, probably a second laying. All the nests examined by me were found in the creek bottoms or else close by, generally in clumps of mesquite bushes.

I found a set of eggs, slightly incubated, on September 14, and might have found them breeding still later, I presume, if I had looked for their nests.

Although the Mexican Ground Dove begins breeding rather late, I believe they usually rear two, if not three, broods a season. The young are fed on small seeds and berries of different kinds, as well as grain, whenever it is procurable. Gravel, in considerable quantities, is used by them to help in grinding up the various seeds they feed on.

The eggs are usually two in number, seldom but one. Incubation lasts about fourteen days, the male assisting in these duties. The eggs are pure white in color, elliptical oval in shape, with now and then one which may be slightly pointed, and a few that may be called oval.

The average measurement of fifty-four specimens in the U. S. National Museum collection, is 21.5 by 16.5 millimetres. The largest egg in the series measures 23 by 17.5, the smallest 20 by 16 millimetres.

The type specimen (No. 20804, Pl. 2, Fig. 24), from a set of two, from the Bendire collection, was taken by myself, near Tucson, Arizona, June 28, 1872.

## 53. Scardafella inca (Lesson).

INCA DOVE.

*Chamæpelia inca* Lesson, Descriptive Quadrupeds, etc., Buffon, 1850, 211.
*Scardafella inca* Bonaparte, Conspectus Avium, II, December, 1854, 85.
(B 452, C 375, R 466, C 549, U 321).

Geographical range: Southern border of United States from Rio Grande Valley of Texas to southern Arizona and Lower California; south to Mexico and Guatemala.

The breeding range of the Inca Dove within our border includes the Rio Grande Valley of Texas, from the vicinity of Laredo to southern Arizona, and its distribution seems to be somewhat irregular. It is also an occasional visitor in the interior of Texas (Austin).

None of the ornithologistsis who have explored the Lower Rio Grande Valley within the past few years, as well as other portions of Texas, appear to have met with this species. Dr. H. B. Butcher, however, seems to have found it abundant near Laredo, Texas, in 1866, and took its nest and eggs there on July 1 of that year. It was placed in the forks of a small mesquite tree.[1]

In southern Arizona it has been met with by different parties. I found it rather a rare resident near Tucson in 1872.

Mr. W. E. D. Scott writes as follows: "The only points where I have seen this species are Tucson and Florence, where it is, especially in the latter place, of common occurrence during the warmer portion of the year. The birds are very tame, and seem to affect particularly the streets, corrals, and gardens in the heart of the town."[2]

Mr. Herbert Brown informs me: "I have examined a number of the nests of the Inca Dove at different times. They are as a rule much better constructed than those of the Mexican Ground Dove. The cavity is about half an inch deep, and the materials used, fine dead twigs, are much more compactly put together than in the nests of the latter. On September 20, 1884, I found a nest of this species in an apricot tree about 10 feet from the ground. The nest contained two eggs, which I did not disturb."

Mr. Xanthus found this Dove breeding abundantly at Cape St. Lucas. One

[1] History of North American Birds, 1874, Vol. III, p. 388.

[2] Auk, Vol. III, 1886, p. 421.

nest was found in a leafless acacia about 6 feet from the ground; another, found May 26, was about 5 feet high, in a small thorn bush; a third was at the height of 8 feet and also placed in a bush; others were placed in small oaks, cacti, opuntias, and in other situations, all above the ground, at heights varying from 5 to 8 feet.[1]

I first met with this species in February, 1872, and saw others from time to time, but never abundantly. I am sure a few pairs bred within a short distance of my camp near Tucson, but I did not find their nests. The only one I obtained was taken in the valley of the Santa Cruz River, near Tubac, Arizona, on June 6, 1872. It was placed in a thick mesquite bush, about 4 feet from the ground, and contained two fresh eggs. The nest was a slight platform of twigs and grasses about 5 inches in diameter. The female was on the nest. The eggs show a slight creamy tint, due perhaps to not being thoroughly cleaned at the time. A set collected by Colonel Greyson, near Mazatlan, Mexico, are pure white in color.

This bird is easily distinguished from the Mexican Ground Dove by its much longer tail; its habits are very similar, and it probably raises two broods in a season.

The eggs, two in number, are scarcely distinguishable from those of the Ground Dove; they are white in color, and elliptical oval in shape.

The average measurement of the four specimens in the U. S. National Museum collection is 21 by 16.5 millimetres. The largest egg measures 22 by 17.5, the smallest 20 by 16 millimetres.

The type specimen (No. 20802 Pl. 2. Fig. 25), from the Bendire collection, was taken by the writer near Tubac, Arizona, June 6, 1872.

## 54. Geotrygon martinica (Gmelin).

KEY WEST QUAIL-DOVE.

*Columba martinica* Gmelin, Systema Naturæ, I, ii, 1788, 781.
*Geotrygon martinica* Bonaparte, Conspectus Avium, II, December, 1854, 74.
(B 454, C 376, R 467, C 550, U 322.)

Geographical range: Haiti, Cuba, Bahamas, and Florida Keys.

Within the limits of the United States the breeding range of the Key West Quail-Dove is confined to the island of Key West and the extreme southern Florida Keys; it appears exceedingly rare now in places where Audubon found them fairly abundant.

Dr. J. Gundlach, in his "Beiträge zur Ornithologie Cuba's" states: "It is not rare. Its general habits resemble those of the Blue-headed Quail-Dove, preferring rocky and wooded regions. I scarcely ever met them outside of the forest. In the densely timbered portions it may be seen scratching among the leaves for food. It likes to perch on horizontal limbs, especially on limbs of the zacsas.

[1] History of North American Birds, 1874, Vol. III, p. 388.

"Its rather doleful call note resembles the syllables 'hu-up.' The nest, consisting of a slight platform of sticks, is usually placed on the top crown of certain parasitic creepers, found in the more open but shady primitive forests. The eggs are two in number, of a pale ochre yellow color, and measure 31.5 by 24 millimetres. I found nests between the months of February and July."

Dr. Juan Vilaró, of the University of Habana, writes me: "The Key West Quail-Dove is quite common and a constant resident on the Island of Cuba. Its food consists of fruits, seeds, small snails, etc. It walks with neck contracted and the tail slightly raised. It perches on trees. It is commonly called *Boyero* (Ox Driver), on account of the resemblance of its call to the signal to stop, 'huup,' given by drivers to their oxen. *Barbequejo* (a kind of bridle) is another of its names, on account of the white stripe extending from the antero-inferior region of the eye almost to the occiput, and resembling the ornamental part of a bridle. In the central and eastern parts of the island it is called 'Torito' (Little Bull), its call notes sometimes resembling a roaring. The nest is placed in high trees as a rule, usually *Curujeyes.* It commences breeding in February and lays until July. The eggs are two in number, ochraceous white in color, and measure 31 by 24 millimetres."

Mr. J. W. Atkins, of Key West, informs me, under date of December 29, 1889: "I have taken but a single Key West Quail-Dove; I have seen several others, but have been unable to find their nests and eggs; and you may infer the rarity of this species here, when I tell you that many local sportsmen to whom I have showed the bird I killed had never seen one or knew that it occurred here."

There are no eggs of this species in the U. S. National Museum collection, and I have been unable to secure a specimen to figure.

## 55. Geotrygon montana (Linnæus).

RUDDY QUAIL-DOVE.

*Columba montana* Linnæus, Systema Naturæ, ed. 10, I, 1758, 163.
*Geotrygon montana* Bonaparte, Conspectus Avium, I, 1850, 72.
(B —, C —, R —, C —, U 322.1.)

Geographical range: Tropical America in general (including the West Indies); north to Cuba, and eastern Mexico (Mirador); accidental at Key West, Florida.

The Ruddy Quail-Dove is entitled to a place in our avifauna, a single specimen having been taken at Key West, December 10, 1888 (Auk, VI, April, 1889, 160, 161, and July, 1889, 246). It is very doubtful if it breeds within our limits.

Dr. Jean Gundlach, in his "Neue Beiträge zur Ornithologie Cuba's," says: "The habits of this species are similar to those of *G. martinica.* It is not found on the cayos or small islands of the coast of Florida, but probably extends to the South American mainland. Nidification and the color of the eggs are the same as with those of the preceding species, *G. martinica*, only the latter are a

trifle smaller, measuring 28.5 by 21.5 millimetres. I found a nest in August, containing two buff-colored eggs which were broken before I measured them. Its call notes are rather misleading, seeming near when distant, and again the reverse. They resemble the syllable 'hup' repeatedly and quickly given. It is not rare; breeds and inhabits the forests, and remains a good deal of the time on the ground searching for food among the dry leaves."

Mr. Philip Henry Gosse, in his "Birds of Jamaica," says: "The Mountain Partridge affects a well-wooded country, and is found in such woods as are more choked with bushes. * * * It is essentially a ground Pigeon, walking in couples or singly, seeking for seeds and gravel on the earth. * * * It is often seen beneath a pimento picking up the fallen berries; the physic nut, also, and other oily seeds afford it sustenance. I once observed a pair of these Doves eating the large seeds of a mango that had been crushed. With seeds, I have occasionally found small slugs, a species of *Vaginulus*, common in damp places, in its gizzard. * * *

"In the Short Cut of Paradise, where the sweet wood abounds, the Partridge is also numerous; in March and April, when these berries are ripe, their stomachs are filled with them. Here, at the same season, their cooing resounds, which is simply a very sad moan usually uttered on the ground, but on one occasion we heard it from the limb of a cotton tree at Cave, on which the bird was sitting with its head drawn in; it was shot in the very act. * * *

"One day in June I went down with a young friend into a wooded valley at Content to look at a Partridge nest. As we crept cautiously toward the spot, the male bird flew from it. I was surprised at its rudeness; it was nothing but a half dozen decayed leaves laid on one another, and on two or three dry twigs, but from the sitting of the birds it had acquired a slight hollowness, about as much as a skimmer. It was placed on the top (slightly sunk among the leaves) of a small bush not more than 3 feet high, whose glossy foliage and small white blossoms reminded me of a myrtle. There were two young recently hatched, callow and peculiarly helpless, their eyes closed, their bills large and misshapen; they bore little resemblance to birds. On another occasion I saw the male shot while sitting; the nest was then placed on a slender bush, about 5 feet from the ground. There were but two eggs, of a very pale buff color; sometimes, however, they are considerably darker."

Seven eggs of this species are in the U. S. National Museum collection, all taken in the West India Islands. They are oval in shape, and rather more rounded than is usually the case with Pigeon eggs. In color they vary considerably, from a pale cream to a salmon buff. The average measurement is 27 by 21 millimetres. The largest egg measures 29.5 by 22, the smallest 24 by 19.5 millimetres.

The type specimen (No. 17886, Pl. 2, Fig. 26), from a set of two, was collected at Sainte Marie, West Indies, April, 1877, by Mr. F. A. Ober. One of these eggs is still darker colored, and three are somewhat lighter tinted. Their shells are very smooth and glossy.

## 56. Starnœnas cyanocephala (Linnæus).

BLUE-HEADED QUAIL-DOVE.

*Columba cyanocephala* Linnæus, Systema Naturæ, ed. 10, I, 1758, 163.
*Starnœnas cyanocephala* Bonaparte, Geographical and Comprehensive List, 1838, 41.
(B 455, C 377, R 468, C 551, U 323.)

Geographical range: Florida Keys and Cuba.

The Blue-headed Quail-Dove is another rare visitor within our borders, and it is doubtful if it breeds with us. No specimens have been taken of late years on any of the Florida islands and smaller keys.

Dr. Jean Gundlach, in his "Beiträge zur Ornithologie Cuba's," writes about the Blue-headed Quail-Dove as follows: "This species is a constant resident of the Island of Cuba, and is likewise found in the extreme southerly portions of the United States, as well as on the Island of Jamaica, but does not seems to occur on the remaining West India Islands.

"It is not uncommon in the extensive forest, especially in such in which the ground is rocky, but is scarcely ever found in cultivated fields or open prairie country. It moves slowly, with the neck contracted and tail erected, while searching for food among the dead leaves on the ground. This consists of seeds of various kinds, berries, and occasionally small snails. After feeding, it usually flies into a tree and perches on a leafless horizontal limb, or on one of the numerous parasitic vines, to rest. In the early mornings, should its plumage, perchance, have become wet while traveling through the dew-laden shrubbery, it selects a sunny spot to dry itself. From time to time this Dove utters her call note, consisting of two hollow-sounding notes, 'hu-up,' the first syllable long drawn out, the second short and uttered very quickly. Besides this note a low muttering is occasionally heard. Their call notes are deceptive, appearing near when distant, and distant when close by. Its flight is noisy when starting, similar to that of the European Partridge, from which it receives its misleading name 'Perdiz.'"

It nests in April and May; the nest is a simple affair, consisting of a few twigs. It is usually placed in the tops of parasitic vines, *Tillandsia*. It lays two white eggs, measuring 35 by 25.5 millimetres.

Dr. Juan Vilaró, professor of the University of Habana, Cuba, writes me: "This Dove is constantly decreasing in numbers, being continually persecuted, notwithstanding it is protected at certain times by the hunting laws."

According to Dr. Bachman, of Charleston, South Carolina, the egg of this species is of a uniform, creamy-white color, and measures 1.43 inches in length by 1.10 in breadth (about 36.3 by 27.9 millimetres). The egg referred to was laid in confinement in his aviary.[1]

I consider the latter description as more probably the correct one. There are no specimens of the eggs in the U. S. National Museum collection.

[1] Birds of North America, 1874, Vol. III, p. 396.

# BIRDS OF PREY.

## Family CATHARTIDÆ. American Vultures.

### 57. Pseudogryphus californianus (Shaw).

CALIFORNIA VULTURE.

*Vultur californianus* Shaw, Naturalists' Miscellany, IV, 1797, Pl. cccl.
*Pseudogryphus californianus* Ridgway, History North American Birds, III, 1874, 338.
(B 2, C 364, R 453, C 536, U 324.)

Geographical range: Pacific coast region of the United States, from Oregon southward, to northern Lower California; (southern Utah?)

The breeding range of the California Vulture, as far as known, is restricted to the State of California and to a comparatively small portion thereof. To define it more definitely it may be located in that part of the State situated between the Sierra Nevada and the Pacific Ocean, between latitude 32° 30′ and 38°. It is possible that a few of these birds breed in the mountains of Lower California also.

Mr. Walter E. Bryant in his "Catalogue of the Birds of Lower California," makes the following statement in reference to this species: "Mr. Anthony is the only one who has reported this species from the peninsula; he has observed them at several places from the sea level to an altitude of 11,000 feet. From the fact of their primary and secondary quills being prized by Mexican and Indian gold miners for use in carrying gold dust, an opportunity to kill a vulture is never allowed to pass unimproved."[1]

Col. N. S. Goss, of Topeka, Kansas, tells me that this Vulture is occasionally found on the Mexican side of our border, in Lower California, and is said to breed there in small numbers.

No other of our larger Raptores has such a restricted range. It has been reported as being seen as far north as the Columbia River, and even on Vancouver Island, by some of our earlier ornithologists, but I believe has not been met with there within recent years. Stragglers have been reported from southern Utah and the vicinity of Fort Yuma on the Colorado River.

This Vulture is readily recognized by its superior size and the conspicuous white area visible on the lower parts of its long and powerful wings when soaring through space. Its flight is graceful beyond comparison as it sails majestically overhead in gradually contracting or expanding circles, now gently falling with the wind and again rising easily against it, without

[1] Proceedings California Academy Sciences, 2d series, Vol. II, 1889, p. 278.

a perceptible motion of its pinions. While on the wing it looks more than the peer of any of our birds, the Golden Eagle not excepted.

Even when comparatively common during the years of 1866–1868, I do not remember ever noticing a single bird of this species on the eastern slopes of the Sierra Nevada. At that time I was stationed at Camp Independence, in Inyo County, California, while directly west of the mountains, not more than a hundred miles in a bee line, these birds were then moderately abundant on the great plains of the Tularé Valley; and I have seen assemblies of them numbering from six to fifteen on several occasions. However, they were never so plentiful at any time as its smaller relative, the Turkey Vulture. Why the range of this Vulture should be so restricted is hard to explain, but to this its rapid decrease is undoubtedly due, and poison has so far been the principal agent.

The home of the California Vulture is among the almost inacessible cliffs of the minor mountain ranges running parallel to the Sierra Nevada. Stockraising has increased enormously in southern California during the past twenty years, and these fastnesses have been completely overrun by stockmen to find pasture for their flocks during the hot summers when everything is dried up in the valleys. Necessity compelled this invasion of the retreats of numerous predatory carnivora, like the grizzly bear, the panther, lynx, and the prairie wolf. These, as a matter of course, preyed on the calves and flocks of sheep that were to be found almost everywhere in the mountains at that time, to be had for the taking, and they naturally enough committed a great deal of damage.

The simplest and certainly the safest way for the stockmen to get rid of such undesirable neighbors was to bait them with poisoned carcasses. This means was resorted to almost everwhere, and generally with considerable success.

The Vultures, too, with their keen sight and scent, found many of these, to them, tempting baits, and being sociable in disposition many of these birds were destroyed by this means, so that by this time comparatively few are said to be left.

From recent information it appears, however, that within the past few years these birds have again commenced to hold their own, and in a few of the more barren and inaccessible mountain ranges in the vicinity of Santa Barbara they do not seem to be decreasing, and may in time regain their former numbers.

Mr. A. L. Parkhurst writes me to the same effect from Monterey, California. He says: "They are still abundant in the wild and rugged districts of this county, are extremely shy, perfectly capable of taking care of themselves, and breed mostly in inaccessible cliffs. One is rarely shot.

"They are retiring from the presence of civilization, as it demands the conversion of the large cattle ranges into small farms. I doubt if they are decreasing in numbers. I have seen over a dozen a day many times."

If, as Mr. Parkhurst states, these birds are still common in Monterey County, it is undoubtedly due to the breaking up of the large cattle ranches and their conversion into small farms. Poison, which has been resorted to on most of the larger stock ranches to kill the carnivora, has certainly almost exterminated the California Vulture as well, and in more than one locality, where they were formerly abundant, their very perceptible decrease is, in my opinion, mainly due to this cause.

Mr. William R. Flint writes me as follows about this species: "I am sorry that I cannot give you any reliable information as to the nesting habits of these birds. I feel confident, however, that they nested not far from my home in San Benito County. I have seen many of these birds there, and my brother claims to have seen some young ones among a group of six or seven old ones. The last time I was at home, in the spring of 1889, I searched for their nests, but failed to find any. I saw several of these birds about, and as a rule they associate with the Turkey Buzzards, and generally fly much higher, so that to an ordinary observer they appear nearly of the same size. The largest number I have ever seen at one time during late years was in the summer of 1884, when I saw fourteen together, and these allowed me to approach within 30 yards of them.

"I remember one Vulture which had its roosting place in an old, half-dead white oak, thickly surrounded by brush and smaller trees. Here he roosted regularly every evening, always appearing by sundown, and usually just before. He was a late riser, as I have seen him there more than once when the sun was two hours high. In this respect they are very much like the Turkey Vulture. I never saw any others roosting in or near this tree. They will often so gorge themselves with food as to be unable to rise from the ground and fly, and I have passed within a few yards of them in a buggy and they would make no effort to get away.

"A vaquero on the ranch lassoed one a few years ago with his riata when it was overgorged with food, and brought it to San Juan, where it was kept chained to one of the adobe pillars in the old mission church. It would show fight on slight provocation, and utter a hoarse, hissing sound when disturbed, flapping its wings violently at the same time.

"I have talked with two parties who claim to have seen nests of these birds. In one instance the nest was placed on a high rugged rock on a cliff, along one of the forks of the San Joaquin River, the other was discovered in a timber tract of the Santa Cruz Mountains, by an old wood-chopper. This nest was said to have been a huge affair, and was placed on the first large limb of a redwood tree, about 75 feet from the ground and close to the trunk. His camp being near this tree, he had a good chance to observe the birds, and says the young, of which there were two, were nearly three weeks learning to fly, after being large enough to leave the nest and crawl out on the limbs. When they finally left the nest they flew over the cañon to a rocky cliff on the opposite side, about a quarter of a mile distant.

"I think there is no foundation for the belief that this Vulture kills lambs and sickly calves. I have never known such a thing to happen, and have seen many Vultures during lambing time, when there were thousands of young lambs to eat, if they had felt disposed to kill any; neither have I noticed them eating dead flesh unless in an advanced state of decomposition."

Mr. Walter E. Bryant writes me as follows: "My experience has been that the California Vulture is extremely rare now. I doubt if I have ever seen it in its wild state. Many reports of its being common, its breeding, etc., which I have investigated at considerable trouble, time, and expense, have been either the Turkey Buzzard or the Golden Eagle seen on the wing."

About their nesting habits, nothing but what has already been published is known, and the egg remains one of the rarest in collections, and is likely so to continue. I have not been able to learn whether any have been taken during the past twelve years.

Dr. Heermann states that a nest of this bird, with young, was discovered in a thicket on the Tuolumne River. It was about 8 feet back from the entrance of a crevice in the rocks, completely surrounded and masked by thick underbrush and trees, and composed of a few loose sticks thrown negligently together He found two other nests of like construction and similarly situated, at the head of Merced River, and in the mountains. From the latter the Indians were in the habit of yearly robbing the young to kill at one of their festivals.

Mr. Alexander S. Taylor, of Monterey, published a series of papers in a California journal relative to this Vulture. In one of these he mentions that a Mexican ranchero, in hunting among the highest peaks of the Santa Lucia Range, disturbed two pairs from their nesting places, and brought away from one a young bird a few days old, and from the other an egg. There was no nest, the eggs having been laid in the hollow of a tall old robles oak, in a steep barranca, near the summit of one of the highest peaks. These birds are said by some hunters to make no nest, but simply to lay their eggs on the ground at the foot of old trees, or on the bare rocks of solitary peaks. Others affirm that they sometimes lay their eggs in old nests of Eagles and Buzzards. Mr. Taylor states that the egg was of a dead, dull white color, and that the surface of the shell was slightly roughened. It was nearly a perfect ellipse in shape, and measured 4.50 inches in length by 2.38 inches in diameter (114.3 by 60.45 millimetres). The eggshell held 9 fluid ounces of water. The young Vulture weighed 10 ounces; its skin was of an ochreous yellow, covered with a fine down of dull white.[1]

I have a sketch of this egg before me, drawn by Mr. W. M. Ord, at Monterey, California, in April, 1859. The exact measurements of this drawing are 116 by 72 millimetres. They do not correspond with those given in the "History of North American Birds," previously mentioned. On the drawing it is stated "color dead white."

I believe that the mode of nidification of the California Vulture is sim-

[1] History of North American Birds, 1874, Vol. III, p. 342.

ilar to that of the common Turkey Vulture, and that as a rule they make but little of a nest, usually laying their eggs on rubbish on the ground found in the immediate vicinity of the nesting site, alongside or in a hollow log, or in crevices of rocky cliffs. It is possible that at times they make use of the abandoned nests of the Golden Eagles, which are common in that part of California, and the nest described to Mr. Flint as being placed in a large redwood tree in the Santa Cruz Mountains was probably such an one, and was made use of by the Vultures after being abandoned by the Eagles.

I have only seen two eggs of this species, both taken by Dr. C. S. Canfield, near San Rafael, California. One of these, No. 9983, is now in the U. S. National Museum collection; the other I saw in the collection of the Academy of Natural Sciences of Philadelphia, Pennsylvania, in 1880, but it has since disappeared. Both of these eggs were of a uniform light grayish-green color and unspotted. The shell of the specimen now before me is close grained and deeply pitted, differing in this respect from the eggs of other Vultures, and is, like those, slightly glossy. It is elongate ovate in shape, and is figured on Pl. 4, Fig. 5; it measures 114 by 65 millimetres. The late Dr. T. M. Brewer described this specimen as of a uniform pale greenish blue, almost an ashy greenish white.

## 58. Cathartes aura (Linnæus).

TURKEY VULTURE.

*Vultur aura* Linnæus, Systema Naturæ, ed. 10, I, 1758, 86.
*Cathartes aura* Spix, Avium Brasiliam, I, 1825, 2.
(B 1, C 365, R 454, C 537, U 325.)

Geographical range: Nearly the whole of temperate and tropical America, including West Indies; south to Falkland Islands and Patagonia; north, more or less regularly, to southern New England, New York, Saskatchewan, and British Columbia.

The breeding range of the Turkey Vulture, more commonly known as the Turkey Buzzard, includes the greater portion of the United States, with the exception of the higher mountain regions of the interior, and of New York and the New England States, where it only occurs as a straggler at rare intervals. An occasional pair may breed in the extreme southern part of Long Island, specimens having been observed there on repeated occasions within recent years during the summer months. It is quite common throughout the South, gradually becoming rarer as it advances northward. East of the Rocky Mountains it is resident throughout the year from about latitude 39° southward; while on the Pacific coast it winters as far north as latitude 46°, near the mouth of the Columbia River.

North of our boundary, Mr. Ernest E. Thompson reports it as common in the Assiniboine Valley, Manitoba; and Dr. Richardson found them late in

the month of June, on the banks of the Saskatchewan, in latitude 55°, which probably marks the most northern point of their breeding range.

The Turkey Vulture is a well known resident throughout the Middle and Southern States, as well as on the Pacific coast. I have seen these birds everywhere in Arizona, California, Nevada, Oregon, Washington, and Idaho. Let an animal be killed accidentally, or die on the march, and you will not have long to wait before some of the Vultures are about.

They look their best aloft, as their flight is exceedingly easy and graceful; while the apparent absence of all effort as they sail in stately manner overhead, in ever changing circles, and without any apparent movement of their well shaped wings, makes them really attractive objects to watch; but let them once descend to the ground or alight on a tree, and their attactiveness ceases; now they are anything but prepossessing, and it requires no effort to place them where they properly belong, among the "scavengers of the soil."

Dr. William L. Ralph writes me: "In Florida they are abundant and appear to decrease but little in numbers. When not molested they become very tame, and in many of the Southern cities and villages they can be seen walking around the streets or roosting on the house tops with as little concern as domestic animals.

"Although they eat carrion, these birds prefer fresh meat, and the reason of their eating it when decayed is that they cannot kill game themselves and their bills are not strong enough to tear the tough skin of many animals until it becomes soft from decomposition. I have often had Ducks and other game, which I had hung in trees to keep from carnivorous animals, eaten by them. When they find a dead animal they will not leave it until all, but the bones and other hard parts, has been consumed, and if it be a large one, or if it have a tough skin, they will often remain near it for days, roosting by night in the trees near by. After they have eaten—and sometimes they will gorge themselves until the food will run out of their mouths when they move—they will, if they are not too full to fly, roost in the nearest trees until their meal is partly digested, and then commence eating again.

"Many times I have seen these birds in company with the Black Vulture floating down a stream on a dead alligator, cow, or other large animal, crowded so closely together that they could hardly keep their balance, and followed by a number on the wing. I never have seen them fight very much when feeding, but they will scold and peck at one another, and sometimes two birds will get hold of the same piece of meat and pull against each other until it breaks or until the weaker one has to give it up."

A specimen shot by me on September 22, 1872, at my camp on the Rillitto Creek, near Tucson, Arizona, was so completely gorged with small minnows, each about 1½ inches long, that they filled its mouth. How and where it got these fish has always been a puzzle to me; they were not decayed, and must have been caught alive, or found very shortly after death. I noticed

that in Arizona, during the hot summers, these birds generally kept their wings partly open, both when perching on trees or alighting on a carcass, giving them an extremely drowsy appearance.

The young when first hatched are covered with soft, white down, and the nesting sites are not always the filthy places described by many observers.

On July 12, 1883, I found, near the Klamath Indian Agency, a nest containing two young, perhaps a week old, in a cavity of rocks that was quite clean, and there was scarcely any disagreeable odor perceptible about it. The young were sitting on the bare ground and made a slight hissing sound when touched. They are fed in the same manner as young Pigeons, the parents disgorging food into the mouths of the young.

In most of the Southern States nidification begins usually about the latter part of March, occasionally even in February; in the Middle States generally about the last week in April or the beginning of May, and in the more northern portions of its range it may be protracted till June, according to the season.

Capt. B. F. Goss writes me: "I have found this species nesting in Kansas, in caverns and crevices of rock, in hollow trees, and on the ground in hollows of old logs. In Texas I found a large number of nests, one in an old Heron's nest, one on a cactus about 3 feet from the ground, the rest all on the ground under thorny shrubs. They make little or no nest; I have found eggs lying on the bare rock. They sit pretty close, but on near approach will leave the nest if the way is open, but if confined in a cavern or hollow log, will often refuse to move, and if disturbed will disgorge the foul contents of their stomachs, when the intruder will be glad enough to beat a retreat. While rearing their young the nest is always foul and sometimes the stench is unbearable. In southern Texas I found eggs as early as February 15, and up to May 2. In a single instance I found three eggs in a nest; this was placed on the ground under a bunch of thick bushes."

Mr. P. W. Smith, jr., found a nest of this species, which also contained three eggs, near Greenville, Illinois, and four young are recorded to have been found in the same nest by W. W. Edwards, near Abbeville, Louisiana.[1]

Mr. Lynds Jones writes me from Grinnell, Iowa; "I once started a Turkey Buzzard from her nest, and found among the matter thrown up mice and pieces of a skunk, evidently very recently killed.

"The nesting site was a hollow stump, resorted to year after year, until it fell to pieces from old age. At the time I flushed the bird no others were anywhere in sight, but very soon six others came at the summons of the female. When they alighted, their wings remained spread. The only sound they made was a peculiar choking, hissing noise, as they sailed past me about a rod away. The eggs were deposited on the punk at the bottom of the stump, with no attempt at a nest."

[1] Ornithologist and Oölogist, Vol. x, 1885, No. 5, p. 80.

In the West, they breed most frequently in rocky canons, in the foothills of the mountains, up to an altitude of 7,500 feet, depositing their eggs in small caves or crevices of the many cliffs. Mr. W. E. D. Scott found a nest on May 2, 1885, on the Santa Catalina Mountains at an altitude of 5,000 feet. It was placed between two large bowlders.

In the Middle and Southern States the Turkey Vulture breeds more often in the heavily timbered bottom lands, adjacent to the larger streams, as well as in swampy regions. The nest may be found on the ground, under an old log, or in a hollow tree; and even an old Hawk's nest, as high as 40 feet, is occasionally used.

Mr. J. W. Preston states: "The Turkey Vulture will sometimes go into an aperture far up a tree and follow the hollow clear to the ground. At Spirit Lake, Iowa, I took a set of two eggs from an old elm tree, which leaned in the form of an arch; the bird made its way into the tree at the broken off top, and deposited the eggs near the roots of the tree, where I relieved her of them, by the help of an axe. I have seen the female leave the nest to feed, and the male has been seen visiting the nest while the former incubated, but I do not know that he carried food to her; he is very solicitous, however."

The only note they have is of a hissing wheezy sound when disturbed, and this is generally only uttered on such occasions. In southwestern and southern Texas, as well as in other regions where this species is abundant, they breed as often in communities as singly; the nests, if they can be called such, being generally placed on the ground, under the shelter of small bushes on a side hill, and again in low places on salt marshes of the seashore, or in thickets in river bottoms. They are not at all particular in the selection of a nesting site. Two eggs are usually laid, occasionally but one, and very rarely three. These are among the handsomest of the eggs of the Raptores, Their ground color is generally a light creamy tint, occasionally a dull dead white, with a very faint trace of green in some few instances. They are blotched, smeared, and spotted with various shades of reddish brown, chocolate, and lavender, the markings usually predominating about the larger end of the egg, and are very irregular in outline. In eggs belonging to the same set, the markings frequently differ greatly in size and intensity, one being heavily marked and the other but slightly. Occasionally an egg is found which is entirely unspotted. These eggs also vary greatly in shape; the majority are elongate ovate, a few are ovate, others elliptical ovate, and now and then one is perfectly cylindrical ovate.

The average measurement of thirty-four specimens in the U. S. National Museum collection is 72 by 49 millimetres. The largest egg of the series measures 83.5 by 50, the smallest 68 by 46 millimetres.

The two type specimens show about the average types of the heavier and lighter colored eggs of this species.

No. 17608, from a set of two (Pl. 4, Fig. 1), was collected by Mr. Robert

Ridgway, near Mount Carmel, Illinois, May 6, 1878. No. 21574, from a set of two (Pl. 4, Fig. 3), was taken near Ilchester, Maryland, on May 30, 1884, by Mr. C. W. Beckham.

### 59. Catharista atrata (Bartram).

BLACK VULTURE.

*Vultur atratus* Bartram, Travels in Carolina, 1792, 285.
*Catharista atrata* Gray, Handlung 1, 1869, 3.
(B 3, C 366, R 455, C 538, U 326).

Geographical range: Whole of tropical and warm temperate America, south to Argentine Republic and Chile, north regularly to North Carolina and Lower Mississippi Valley, western Texas; irregularly or casually to Maine, New York, Ohio, Indiana, Illinois, Kansas, and South Dakota.

The Black Vulture or Carrion Crow has a much more restricted distribution than the preceding species. It is less roving than the former and is generally a constant resident wherever found, except in the extreme northern portion of its range. It is also far more abundant on the seaboard than in the interior.

The breeding range of this Vulture may be defined as follows: On the Atlantic coast, from southern North Carolina, southward through the South Atlantic and Gulf States. In the interior it has been found breeding in both southern Indiana and southern Illinois, but seems to be very irregularly distributed. It occasionally straggles into southern Ohio, and specimens have been taken in New York, and even in Maine. It has also been found breeding in Kansas, but on a single occasion only, as far as known. In Texas it is a summer resident in the central and western parts of the State, and in the southern portions it is found throughout the year.

Mr. William Lloyd found it breeding near San Angelo, Tom Green County, in June, 1884, and he writes me in this connection as follows: "A strange habit of both the Black and the Turkey Vulture in western Texas is the fact that though abundant in summer, in winter we are left without a single one. This is not due to lack of carrion, for every winter the place is full of dead cattle, nor to temperature, for here in Presidio County it rarely freezes. The altitude, too, is rather less than in Concho County and the Staked Plains, where the same state of affairs obtains. Then why is it that this bird, and especially the Turkey Vulture, which is well known to winter much farther north in other regions, is entirely absent from the bend of the Rio Grande and the Concho Valley during this season?"

The Black Vulture is only common in the southern parts of the United States, usually outnumbering the Turkey Vulture near the seashore and being outnumbered by the latter in the interior. It rarely breeds north of latitude 36°.

In its habits it differs but little from the Turkey Vulture. It is not nearly so graceful a bird on the wing as the latter, its flight being much heavier and apparently laborious, and is accompanied by considerable flapping of the wings.

Mr. Clement S. Brimley, of Raleigh, North Carolina, found a pair of these birds breeding on April 21, 1890. The nest was a slight affair and contained two slightly incubated eggs. It was placed under the elevated end of a prostrated log near a swamp. Another, found on May 5, containing also two eggs, was placed under the shelter of two huge bowlders on a sloping hillside near a stream; incubation had begun.

Mr. Walter Hoxie describes the breeding habits of this species as follows: "Buzzard Island lies in a bend between Ladies Island and Wassa Island, and is about 3 miles in a direct line from Beaufort, South Carolina. It is about 1½ acres in extent, and surrounded by boggy marsh, beyond which, at low tide, stretch wide flats of gray mud, liberally dotted with banks of coon oysters. * * *

"Perhaps a dozen or twenty pairs breed here regularly, the most of them being the black species (*Catharista atrata*), though a pair or two of the Turkey Buzzards may be observed every year. The portion of the island most frequented by them is the west end. Here, under a dense growth of yucca, I have taken nineteen eggs in one afternoon, and seen at the same time five or six pairs of newly hatched young. There is never the slightest attempt at forming a nest, or even excavating a hollow. The eggs are laid far in under the intertwining stems of the yuccas, and, in the semishadows, are quite hard to be seen. The parent birds, however, have the habit of always following the same path in leaving and approaching their precious charge, and after a little experience I learned to distinguish these traces so well that I seldom failed to follow them up and secure the coveted specimens. This track is seldom if ever straight. It winds under and around the armed stems, and the difference in bulk between a man and a Buzzard being considerable, the pointed leaves find a good many of a fellow's weak points before he reaches his prize. * * *

"Quite rarely I have found eggs on the other parts of the island, and once or twice in completely exposed situations, with not even an attempt to get under the protection of an overhanging bush. Possibly these belonged to young birds which had still much to learn in regard to the ways of housekeeping. I have also occasionally found isolated nests upon the outer Hunting Islands. In these latter cases the eggs have always been easy to find, for being among clean sylvan surroundings the collector need only follow his nose—if it is a good one success is certain.

"Both sexes assist in the work of incubation. A week or ten days often elapse between the deposition of the two eggs, but I have never observed over a day's difference in the time of hatching. Indeed, I have never found a bird sitting on a single egg. The period of incubation is very nearly thirty days, but I have not yet decided this quite to my satisfaction. I have never taken more than two eggs in a set, but my friend, Mr. Alfred Cuthbert, of this place, took a set of three in 1884. I am not certain that two broods are not sometimes raised. I have myself taken eggs only from April 2 to May 26, but I have heard of young observed as late as August."[1]

[1] Auk, Vol. III, 1886, pp. 245–247.

Dr. William L. Ralph writes me: "In Florida the Black Vulture resorts to the cypress swamps to nest, and its eggs are laid in slight depressions, on small hillocks that rise above the water, and lined only with the dead leaves and other vegetation that were there originally. Although I have never found many of their nests, I believe that they usually breed in these swamps, for I have often found them, sometimes in considerable numbers, in such situations during the breeding season. As a rule their eggs are very hard to find, for the birds leave them before one can get within sight of their nests, and will not return as long as anyone remains in the vicinity. The earliest set that I have collected was taken March 29, and I have found fresh eggs from that time until the middle of April."

Mr. W. W. Worthington found a small colony of the Black Vultures breeding near Beaufort, South Carolina, March 15, 1886. The nests, of which he secured four, were all placed under a thick growth of yucca, in a small hammock surrounded by marsh. Three nests contained two eggs each, the fourth but a single one, and in this incubation had begun.

Mr. A. W Butler, of Brookville, Indiana, informs me that a pair of these birds nested 4 miles west of Brookville, in May, 1889. The nesting site was a hollow sycamore about 20 feet high; the two eggs were placed upon the ground, inside.

Both Mr. G. B. Sennett and Dr. James C. Merrill, U. S. Army, report these birds as abundant on the Lower Rio Grande in Texas, nesting on the ground or under hollow logs in the woods. Capt. B. F. Goss also found the Black Vulture abundant near Corpus Christi, Texas, nesting on the ground, under thick bushes or under logs. Eggs were taken by him between April 4 and May 13.

From the foregoing accounts it will be seen that the Black Vulture is more or less gregarious in its habits at all times, breeding frequently in small communities, making little or no nest, and the eggs, usually two in number, are, perhaps with exceedingly rare exceptions, always placed on the ground, in canebrakes, under bushes, old logs, on rocks, and again in perfectly open and unsheltered situations. Occasionally but one egg will be laid, and very rarely three. In the more Southern States nidification begins about the 1st of March, and later northward.

Probably but one brood is raised in a season. The young when first hatched are covered with light buff colored down, and they are fed in the same manner as the young of the preceding species.

The eggs of the Black Vulture are readily distinguished from those of the Turkey Vulture by their different ground color, somewhat larger size, and fewer markings as a rule. By far the greater number of eggs are elongate ovate, a few are short ovate, others elliptical ovate. Their ground color is a pale gray green; in none of the specimens before me can it be called a creamy white; the tint is perceptibly different. In an occasional specimen it may be called pale bluish white, like well watered milk, but the first mentioned color predominates.

The markings vary from chocolate to reddish brown of different tints, and mixed among these, in about one-half the specimens, are found shell markings of lilac and lavender; in an occasional specimen these predominate over the first mentioned tints. In the series before me all the markings are rather irregular in shape and are clustered about the larger end of the egg. They are usually large, and seldom confluent. A few eggs are but slightly marked, and the spots are small and fine, but none are entirely unspotted.

The average measurement of seventeen specimens in the U. S. National Museum collection is 76.5 by 52 millimetres. The largest egg measures 84 by 55, the smallest 68.5 by 47 millimetres.

Of the type specimens, No. 20704 (Pl. 4, Fig. 7) was collected March 12, 1875, in Comal County, Texas, and No. 20705 (Pl. 4, Fig. 10) was collected April 12, 1885, in the same county and place. Both types are from the Bendire collection, and were obtained originally from the late Mr. E. Ricks cker, of Nazareth, Pennsylvania. They show the heavier and lighter marked types found in the eggs of this species.

## Family FALCONIDÆ. Vultures, Falcons, Hawks, Eagles, etc.

### 60. Elanoides forficatus (Linnæus).

SWALLOW-TAILED KITE.

*Falco forficatus* Linnæus, Systema Naturæ, ed. 10, I, 1758, 89.
*Elanoides forficatus* Coues, Proceedings Academy Natural Sciences, Philadelphia, 1875, 345.

(B 34, C 337, R 426, C 493, U 327.)

Geographical range: Tropical and warm temperate portions of continental America; north in the interior regularly to Illinois, Iowa, Minnesota, casually to Manitoba, and Assiniboia, etc.; along the Atlantic coast casually to Pennsylvania, New York, and southern New England; accidental in England.

Although the breeding range of the Swallow-tailed Kite within the limits of the United States must be considered as quite extensive, it is a very irregular one, and the birds are only summer residents over the greater part of their range. It breeds regularly in Florida and South Carolina, and probably farther north along the Atlantic seaboard, in the States of North Carolina and Virginia, and apparently even in New York State, where several Kites were observed on different occasions in Rensselaer County, in the latter part of July and the beginning of August, 1886, strongly suggesting their breeding in that vicinity during the season in question.

From Florida westward it is irregularly distributed through the Gulf States, including the greater portion of Texas It also breeds in the interior in suitable localities throughout the entire length of the Mississippi Valley, and in the States adjacent to our northern boundary, and a few pass this, as it has been observed on different occasions in the British provinces of Assiniboia and Manitoba, in latitude 50°

Stragglers have been taken during the summer months in many of our Northern States, as well as in England, but few winter within our borders, and, excepting in portions of Florida and Texas, it must be considered as rather a rare species throughout its summer range. It is also found throughout the greater part of the South American continent as far south as the Argentine Republic and Chile.

Dr. William L. Ralph, who has had excellent opportunities to observe the Swallow-tailed Kite in Florida during several seasons, writes me as follows about it: "Excepting, perhaps, the Turkey Vulture, I think this bird is the most graceful of any while on the wing. It has the same easy floating motion, but at times it flies very rapidly and turns very quickly, which is something I have never seen the former bird do. Their motions are very 'swallow-like,' and that, with their forked tails, makes them look like gigantic Barn Swallows; and like the Chimney Swifts they have a habit of traveling together in small companies, usually consisting of three individuals, especially when they first return from the south. During the breeding season flocks consisting of from two or three to ten or twelve birds, but oftener of three, may be seen following one another around, frequently uttering their calls and circling in and out among the tree tops so fast as to make one dizzy to look at them. Except during this season one seldom sees one of these birds unless it is flying, and I have often wondered if they did not at times sleep while on the wing. At least I know that they usually if not always eat while flying, for I have many times seen one sailing leisurely along, occasionally bending its head to tear a piece from a small snake that it held in its talons, and I have never seen one alight to eat its food, as other birds of prey do.

"When hunting they fly quite close to the ground, like Marsh Hawks, but at other times they sail above the tree tops, and sometimes so far above that it takes a good eye to see them. Their food consists almost entirely of reptiles. Small snakes seem to be a favorite article of food with them. I never have seen one catch a bird, and believe they do not. This habit of eating snakes has given them the name of 'Snake Hawk' among the natives of Florida.

"Swallow-tailed Kites begin to arrive in this State from the south about the middle of March, but do not become common until two or three weeks later. They appear to be as abundant now as formerly, probably because most of the tourists have left Florida before they arrive in any numbers. Although these birds are common in the southern half of St. Johns County, and that part of Putnam County east of the St. Johns River, and though I have found quite a number of their nests, I have never been able to get but two sets of their eggs, owing to a habit they have of building in places that are very hard to reach.

"The first nest was taken April 22, 1887, 11 miles northeast of Palatka, Florida, and contained two eggs, so nearly hatched that the embryos in them

were feathered. It was situated 90 feet above the ground in, or rather on, the top of a very slender pine tree growing on the edge of a cypress swamp. The trunk of this tree at a height of 5 feet above ground was not more than 15 inches in diameter, and at the place where my climber stood, as he took the eggs, it was less than 3 inches, while the limbs he stood on were only about an inch thick. The nest was composed of large twigs thickly covered with Spanish moss (*Tillandsia usneoides*) and long moss (*Usnea barbata*), lined with the same materials, with the addition of a few feathers from the birds. It measured 20 inches in length, 15 inches in width, and 12 inches in depth on the outside, and 6 inches in diameter by 4 inches deep on the inside.

"The nests of this species are usually so very irregular, that I should think they simply hollowed out bunches of mossy twigs that they found lodged in the tops of trees, had I not often seen them carrying this material to nests that they were building.

"Both birds were present when the eggs were taken and made much ado They would dive at the head of my climber, uttering their shrill but rather feeble cry, and at times were so fierce that he had to stop and strike at them with his hat to prevent them from striking him. This set of eggs is the earliest I have record of, and if it takes these birds four weeks to hatch their eggs, as it usually does the larger Hawks in the north, they must have been laid before April 1. They usually commence laying about the middle of April, and I have found them sitting on their nests from that time until the 1st of June, the latter being the latest date I have ever remained in Florida. Most of them have their eggs laid by the middle of May. One nest which I saw these birds building was deserted for three or four weeks and then reoccupied, but whether or not by the original pair, I do not know.

"The second nest was taken 7 miles northeast of San Mateo, Florida, April 14, 1888, and contained two fresh eggs. It was also situated in the extreme top of a slender pine, in every respect an exact counterpart of the one that held the first nest. The difference in the height of the two was less than a foot. As nearly as I could judge, about three-fourths of the nests of this species found by me were about the same distance above the ground, *i. e.*, they were 90 feet, and the remainder from a little above that height to 125 or 130 feet. The birds to which the second set belonged were not so pugnacious as the owners of the first, but they made a great fuss, and soon had four others of the same species with them to see what was going on, and these seemed as much concerned at the disturbance of the nest as the owners themselves. They were less fierce than the first on account of their eggs being fresher, for, like all birds, they exhibit more anxiety just before and just after the eggs are hatched than at any other time. The nest of this pair was composed of large twigs, Spanish moss, and pine needles, lined with green moss and small twigs. The earliest date on which I found this species breeding was April 5, 1891, when I took a set of two eggs, 8 miles southeast of San Mateo, Florida. Both eggs were rather smaller than the usual size and also lighter colored.

One had been incubated for about a week, the other was fresh. The nest was situated in the extreme top of a slender pine, 86 feet from the ground. Both parents made much ado, flying down at my climber from above at an angle of about 45 degrees. The call note of this species sometimes sounds very much like the 'peet, peet,' of the Spotted Sandpiper.

"I think both parents assist in incubation, and that but one brood is raised in a year. In Florida, like the Bald Eagles, they nearly always nest in pine trees and in the tallest they can find, but, unlike the latter, which always select trees of the greatest diameter, they choose the very slimmest.

"They usually breed in wild uninhabited localities, but, except in regard to their nests, they appear to have but little fear of man, and are often to be seen flying around among the houses of the small villages in this vicinity. The places resorted to for breeding are the low-lying pine woods, and the nests are usually built in trees that grow in or near the cypress swamps, so common in these situations.

"The Swallow-tailed Kite has a peculiar way of leaving its nest, for instead of flying directly from one side, as other birds do, it nearly always rises straight up for a short distance first, as if it were pushed up with a spring, and, when about to alight on its nest, it will poise itself a short distance above its eggs and then gradually lower itself down on to them. When they are thus poised above their nests there is scarcely a perceptible movement of their wings, and they often lower themselves so gradually that one can hardly tell when they have reached their eggs."

According to Mr. J. W. Preston, these birds nest in Becker County, Minnesota, from about May 15 through June, the nests being usually placed in basswood trees and in the extreme tops, from 50 to 80 feet high. An unusual nesting site found by him was in a slender canoe birch about 40 feet from the ground. Their call notes are a shrill keen "e-e-e," or "we-we-we," uttered in a high key, which is very piercing and may be heard at a great distance. In Minnesota their nests are usually found in dense woods not far from lakes. They are highly gregarious; disturb a nest and every Kite in the neighborhood is soon on hand. He has found them not apt to attack a person, but they do attack other birds coming in the vicinity of their homes. He says: "Of all aërial performances I have ever witnessed, the mating of the Swallow-tailed Kite excels. Ever charming and elegant, they outdo themselves at this season. In the spring of 1886 they chose as their mating ground an open space over the mouth of an ice-cold brook that made its way out from a dark tangled larch swamp. From my boat on the lake I had an excellent view of them. All the afternoon seven of these matchless objects sported, chasing each other here and there, far and near, sailing along in easy curves, floating, falling, and rising, then darting with meteor-like swiftness, commingling and separating with an abandon and airy ease that is difficult to imagine.

"Next day three pairs were selecting nesting sites. They are extremely particular in regard to the matter of a nest, and may not be disturbed in the

least, or they choose another home. Nesting materials (twigs and moss) are carried by the female in her talons, the male following close, and going on the nest to arrange them. Days, and sometimes even weeks, are required to suitably complete the structure. During this time they work in the morning and fly over the lakes and woods in the afternoon. The nest is usually built on the foundation of an old one of a previous year. The female does not alight to secure nesting materials, but snatches them while in full flight. Once, while standing in a larch swamp, a Kite dashed by me and took up a small twig, heavily draped with *usnea*, and proudly soared out over the woods with it. Near their breeding ground they seem to be constantly on the wing. I have known as many as six pairs to nest within a small area. Once incubation has commenced the female sits nearly constantly and seldom leaves the nest, and the male faithfully feeds and protects her. Some days before laying the eggs the female rests, being very quiet and droopy, and I noted this in many birds. I have taken but two nests of this species, one containing two eggs, the other but a single one."

Mr. George G. Cantwell writes me as follows: "The Swallow-tailed Kite is not uncommon in the vicinity of Minneapolis, Minnesota, and especially around Lake Minnetonka. I think about a dozen pairs, and possibly more, breed every year about this lake. They are quite fearless and hunt for their prey right on the lawns in front of the summer hotels and the numerous cottages on the shores of the lake.

"I took but a single nest of this species there about May 15, 1887. It was placed in the top branches of a tall maple, about 60 feet from the ground, and which contained four eggs on the point of hatching. A farmer who showed me this nest, told me that about a week before he destroyed another close to his house containing the same number of eggs and killed the parents fearing that they might some day carry off some of his poultry, as a good many other Hawks had already done so."

Mr. George E. Beyer also found a set of four eggs on Milton Island, Lake Pontchartrain, Louisiana. This nest was placed in the top and near the trunk of a cypress tree, 60 feet from the ground. It was taken June 16, 1889; the eggs contained embryos about a week old. The nest was composed of dry twigs carelessly and loosely laid together, lined with moss and a few pieces of snakeskin, evidently *Bascanium constrictor*.

The Swallow-tailed Kite is, on the whole, a perfectly harmless and beneficial bird, feeding to great extent on reptiles of various kinds, beetles, grasshoppers, crickets, cotton worms, small frogs, and tree toads. It is doubtful if it ever kills a bird.

In Texas, the Indian Territory, and Kansas, this species builds frequently in the tops of the tallest cottonwood trees, occasionally in pin oaks or pecans, where these are found, and always as near to the tops of the trees as the nest can safely be placed.

Nidification varies according to locality, beginning about the first week in

April in the more southern portions of its breeding range, and correspondingly later farther north, sometimes not before the first or second week in June.

Two eggs are generally laid to a set, occasionally but one, and rarely three or four. The average measurement of twenty specimens from different parts of the United States is 47 by 37 millimetres. The largest egg in this series measures 50 by 39, the smallest 41.9 by 34.5 millimetres. I consider these eggs as handsome as those of any of our Raptores. They are usually oval in shape; some approach an elliptical ovate. The shell is moderately smooth and close grained. The ground color varies from a dull to an ashy white, and again it may be a delicate cream color.

The eggs are spotted and blotched with different shades of rich brown and ferruginous, usually irregular in outline, and varying considerably in amount. These markings sometimes form an irregular band running from the center to the smaller end, and frequently become confluent Occasionally a specimen is found in which the markings are very few and small in size, scarcely any being larger than a No. 10 shot, and the majority smaller. In a few specimens light lavender colored shell markings, generally of small size, are also visible. There is a great deal of difference in the style and markings of these eggs if a number are compared, but they can readily be distinguished from the eggs of any of our Raptores.

Of the type specimens, No. 20671, U. S. National Museum collection (Pl. 5, Fig. 1), selected from a set of two, represents one of the more lightly marked types; it was originally in my collection, and taken in Black Hawk County, Iowa, June 3, 1875. Another (Pl. 5, Fig. 2), from the collection of Dr. William L. Ralph, Utica, New York, also from a set of two, was taken near San Mateo, Florida, April 14, 1888, and kindly loaned for the purpose of figuring.

## 61. Elanus leucurus (Vieillot).

WHITE-TAILED KITE.

*Milvus leucurus* Vieillot, Nouveau Dictionaire, xx, 1818, 563 (errore 556).
*Elanus leucurus* Bonaparte, Geographical and Comparative List, 1838, 4.
(B 35, C 336, R 427, C 492, U 328.)

Geographical range: Tropical and subtropical America (except West Indies), north to South Carolina, southern Illinois (casual?), the Indian Territory and middle California. Accidental in Michigan.

The breeding range of the White-tailed Kite, so far as is actually known by the taking of their nests and eggs, seems to be confined to South Carolina (where Mr. Ward, Audubon's assistant, found it nesting on the Santee River early in March), Florida, the Indian Territory, Texas, and the middle portions of California.

It is said to occur in Georgia, Alabama, Mississippi, Louisiana, and southern Illinois, and probably breeds sparingly in all these localities,

but it must be considered rare east of the Mississippi River, and is not a common species anywhere within the limits of the United States. It extends over the South American continent to the Argentine Republic. Within our borders it is perhaps most often found in California, where it is a constant resident. It probably also winters in Louisiana and southern Texas. Stragglers are reported to occasionally reach Michigan, where G. A. Stockwell is said to have met with it.

The first eggs of this species, a set of four, obtained by the Smithsonian Institution, were taken by Mr. J. H. Clark, May 9, 1861, near Fort Arbuckle, Indian Territory, and are now in the collection.

Prof. B. W. Evermann took several sets in California, in 1880 and 1881. He writes me: "I found my first set, containing three eggs, May 4, 1880. They were nearly ready to hatch. The nest was near the end of one of the topmost limbs of a cottonwood (*Populus*) near Santa Paula. It was constructed of coarse sticks, lined with shreds or strippings of the inner dead bark of the cottonwood. I took no others in 1880, but in 1881 I met with better success. On April 12, I got a set of four and another of five eggs, all fresh. These nests were placed in the extreme tops of two unusually tall live oaks (perhaps 45 or 50 feet from the ground), and, like the other, were rather flat structures of sticks, lined with the same material as the first, with the addition of a little straw (barley, I think). These two nests were also found near Santa Paula. In one of them a second set was laid early in June.

"The actions of this species when their nest is approached are interesting. I think in every case the bird would leave the nest while I was quite a distance from the tree, and quietly fly off to another near by. There it would remain until I had nearly reached the nest, when it would fly toward me, and when about 20 to 30 feet above me and the nest, it would balance itself in the air as Sparrow Hawks and Bluebirds often do, and with legs hanging down would utter its distress note a few times and then fly away, probably not to return again, but simply to watch me from some tree top several rods away. The note, as I remember it, is a broken cry or scream. When the female hovered over my head, the male made his appearance also, but came no nearer than a tree several rods away.

"On November 20, 1880, I shot a White-tailed Kite from a telegraph pole while sitting in my buggy, and as it fell to the ground its mate flew to it, and was also secured. I do not regard this bird as at all common. I have seen solitary individuals skimming over the fields near San Buenaventura, the marshes up towards Saticoy, and at various other places up the Santa Clara Valley, as far as Newhall, 50 miles from the coast."

Mr. L. Belding gives the White-tailed Kite as a constant and common resident about Stockton, California, and says: "I have seen as many as twenty at the same moment within a circle of half a mile. I have also noticed it at Marysville in winter. It is rarely seen away from the tule marshes."

Mr. A. L. Parkhurst informs me that he found this species breeding near San José, California, from March 15 to April 10—their nests being generally well hidden among the leaves near the tops of the trees, usually at a height of about 30 feet. Their usual resorts during the breeding season are the banks of streams or the fresh water marshes, especially if a few scattered live oaks or willow groves are close by, and their favorite nesting sites are the tops of live oaks, although other trees are also made use of whose foliage securely conceals the nest during incubation. These birds can be found near the tree in which they intend to breed as early as January. Sometimes several birds are anxious to secure the same site, and in such a case fights are sure to result, not alone for first choice of a nesting site, but also for a mate. As soon as a pair have mated, they proceed to drive away from the neighborhood all others of their kind, and even larger and more powerful birds of prey are taught to respect their claims to the locality selected.

"As soon as the male feels secure in his possession he takes his stand upon the top of a tree near by, whose foliage is not so thick as to obstruct the view, yet where he is practically concealed, and from this station he is ever watchful for the approach of an enemy. I have not been able to get sufficiently close to a nest to enable me to observe the manner of nidification without being detected by the male. I am satisfied, however, that it is accomplished by the unaided effort of the female, while the former is doing picket duty.

"The nest is composed of small dead twigs, placed in the upright forks of a limb, and is neatly lined with dry stubble and grasses. The cavity is usually about 3 inches deep. It is much of the same order of architecture as an ordinary Crow's nest, but is a trifle larger and quite as neat. The date of laying varies somewhat with the season. The first nest I found was on April 6, 1883. It contained four eggs that were about half hatched. I took three sets of eggs from this tree in as many different years, but each time a different nest was built. These birds breed in the same locality from year to year, often in the same tree, but according to my observations they always build a new nest each season."

Other observers describe the nest as a slight structure and shallow, and say it is placed occasionally in sycamore trees or maples, but their favorite tree for a nesting site seems to be the live oak.

Messrs. Sclater and Hudson give a good account of the habits of this species in "Argentine Ornithology" (Vol. II, pp. 71, 72). Extracts from this are as follows: "This interesting Hawk is found throughout the Argentine Republic, but it is nowhere numerous. It is a handsome bird, with large ruby-red irides, and when seen at a distance its snow-white plumage and buoyant flight gave it a striking resemblance to a Gull. Its wing power is indeed marvelous. It delights to soar, like the Martins, during a high wind, and will spend hours in this sport, rising and falling alternately, and at times, seeming to abandon itself to the fury of the gale, is blown away like thistle down, until, suddenly recovering itself, it shoots back to its original position. Where there

are tall poplar trees these birds amuse themselves by perching on the topmost slender twigs, balancing themselves with outspread wings, each bird on a separate tree, until the tree tops are swept by the wind from under them, when they often remain poised almost motionless in the air until the twigs return to their feet.

"When looking out for prey, this Kite usually maintains a height of 60 or 70 feet above the ground, and in its actions strikingly resembles a fishing Gull, frequently remaining poised in the air with body motionless and wings rapidly vibrating for fully half a minute at a stretch, after which it flies on or dashes down upon its prey.

"The nest is placed on the topmost twigs of a tall tree, and is round and neatly built of sticks, rather deep and lined with dry grass. The eggs are eight in number. An approach to the nest is always greeted by the birds with long distressed cries, and this cry is also uttered in the love season, when the males often fight and pursue each other in the air. The old and young birds sometimes live together until the following spring."

The food of the White-tailed Kite is said to consist of small rodents, snakes, and small birds. It is evidently a harmless bird in this respect, and rather beneficial than otherwise. Both parents assist in the care of the young.

But one brood is raised in a season; if the first set of eggs should be taken a second one is occasionally laid in the same nest about a month later.

In the United States the number of eggs laid to a set varies from three to five, generally four. Their ground color is creamy white, and they are heavily marked over their entire surface with irregular confluent blotches and smears of dark blood red and claret brown, of different degrees of intensity, the smaller end being often the more heavily colored. But little of the ground color is visible in the majority of the specimens. Some sets are much lighter than others, possibly a second laying; the eggs are usually oval in shape.

The average measurement of eight specimens is 42 by 33.5 millimetres. The largest egg measures 44 by 34, the smallest 41 by 32 millimetres.

The type specimen (No. 2927, U. S. National Museum collection, Pl. 5, Fig. 3), selected from a set of four, was collected by Mr. J. H. Clark, May 9, 1861, near Fort Arbuckle, Indian Territory. The second (Pl. 5, Fig. 4), selected from a set of five eggs, now in the collection of Mr. Josiah Hoopes, West Chester, Pennsylvania, was taken near Santa Barbara, California, on April 14, 1886, and kindly loaned for illustration.

## 62. Ictinia mississippiensis (Wilson).

MISSISSIPPI KITE.

*Falco mississippiensis* Wilson, American Ornithology, III, 1811, 80, Pl. 25, Fig. 1.
*Ictinia mississippiensis* Gray, Genera of Birds, I, 1845, 26.
(B 36, C 335, R 428, C 491, U 329.)

Geographical range: More southern United States, east of the Rocky Mountains, north regularly to Georgia, southern Illinois, Kansas, etc., casually or irregularly, to Pennsylvania, Wisconsin, and Iowa; south through eastern Mexico to Guatemala.

The breeding range of the Mississippi Kite is confined to the southern portions of the United States, from Louisiana, Mississippi, and Texas northward to southern Illinois, the Indian Territory, and Kansas. It likewise occurs in South Carolina, Georgia, Florida, and Alabama, and probably breeds more or less frequently in all these States. It is a casual summer visitor in Iowa and Wisconsin, and is much more abundant west of the Mississippi than east of this stream. A few winter in the Southern States.

Mr. B. G. Gault writes me: "I found the Mississippi Kite abundant in the Red River region of Texas, especially in that portion of it included within Bowie County, where they can be seen at all times of the day and in all sorts of places; but for feeding grounds they seem to prefer the cotton fields. At King's plantation they were particularly abundant, and I have seen as many as eight or ten in the air at one time. Although they do not possess the swallow-like movements in so high a degree as their larger and handsomer relative, the *Elanoides forficatus*, still they do indeed present a pleasing sight, appearing now before us, perhaps 100 or 200 feet above ground; the next minute they are skimming just above the tops of the cotton plants or between the rows, and again they are high in the air, seeming never to tire of these wing evolutions, and it is rarely that one is seen to alight.

"Occasionally, however, I have come suddenly upon them, perched quietly on some dead or decaying tree, and have been greatly surprised at their stupidity in allowing me to approach within 40 or 50 feet of them before they would attempt to take wing. Owing to their numbers, one would readily imagine it not a difficult task to discover the nest of this bird, but in this, after repeated searches, I was badly disappointed.

"July 2, 1888, I came upon a pair of these birds that could not be induced to leave a particular locality on the edge of an old plantation. Very evidently a nest or young were close at hand, but the most careful search failed to reveal one or the other."

The well known ornithologist, Col. N. S. Goss, found this species breeding abundantly in Barber County, Kansas. He writes as follows: "While collecting in this State I found, May 9, 1887, quite a number of the Mississippi Kites sailing over and into the timber skirting the Medicine River,

near Sun City, Barber County, and from their actions knew that they were mating and upon their breeding grounds—a lucky find, worth following up. On the 11th I noticed several of these birds with sticks in their bills (green twigs in leaf) flying aimlessly about as if undecided where to place them, keeping hidden within the trees as much as possible, dropping the sticks when from fright or other cause they arose high above the tree tops. * * *

"I returned to the Kites on the 16th, and remained watching the birds until the morning of the 22d, at which time the nests found, seven in number, appeared to be completed, and I saw a pair of the birds in the act of copulation. A business matter called me home, and I hired the man, with whom I stopped, to climb the trees on the 28th for the eggs, but a hailstorm on the 25th injured the nests badly, and in one case beat the nest out of the tree. On the 31st he collected four sets of two eggs each, and one with only one egg. It being a hard tree to climb, he decided to take the egg rather than wait to see if the bird would lay more. Not hearing from him, I returned to the ground June 10, and put in the day examining the nests, etc., collecting two more sets of two eggs each. * * * The old nests had a few leaves for lining, in addition to the leaves attached to the twigs used in repairing the same, but the new ones appeared to be without additional leaves. They were all built either in the forks from the main body, or in the forks of the larger limbs of the cottonwood and elm trees, and were at least from 10 to 100 rods apart; were not bulky, and when old would be taken for the nests of the common Crow. They ranged in height from 25 to 50 feet from the ground.[1]"

Mr. George E. Beyer writes me that he "took two nests of this species in Louisiana during the season of 1889." According to his observations "but one brood is raised in a season, nidification beginning late, usually about the end of May. The nests are placed in the tops of loblolly pines (*Pinus tæda*) or white oaks (*Quercus alba*), at a height of from 50 to 60 feet. Pine woods are the favorite localities.

"Though of a peaceful disposition, under ordinary circumstances, the Mississippi Kite vigorously attacks all intruders coming too close to its nesting site. A nest found June 10, 1889, was built in a loblolly pine between a fork near the top. It was composed of small dry twigs of water or pin oak and lined with Spanish moss and contained but a single egg. A second nest, found in an oak about 40 feet from the ground, on June 24, 1889, was similarly constructed and lined with the dry leaves of the loblolly pine and moss mixed. This set contained three well incubated eggs, nearly ready to hatch. Both sexes incubate, and the male also assists in building the nest. I have seen this species viciously attacking Crows and Jays when too close to its nest, uttering at the same time a sharp hissing sound composed of two syllables."

According to Dr. A. K. Fisher's experience in Louisiana it would appear

[1] Auk, Vol. IV, 1887, pp. 344, 345.

that this Kite does not always breed so late in that region, as he shot a fully fledged young bird on May 31.

Mr. J. A. Singely has taken several sets of the eggs of this species in Texas. A nest taken in Lee County is thus described: "The foundation and sides of the nest are built entirely of small sticks, the interior portion of small green oak twigs in leaf and leaves of the mesquite tree; the lining is of green moss, on top of which are placed green leaves of the pecan tree. The outer diameter from the ends of the longest twigs is 17 inches, the most compact portion 11 inches; interior diameter 5 inches, outer depth 7 inches, inside depth 1½ inches."[1]

Occasionally a nest is lined with willow twigs in leaf. Mr. H. Nehrling has also found this species breeding in Texas, near Houston, but it is not common there.

The food of this Kite seems to consist principally of grasshoppers, locusts, and other insects, probably varied with a diet of small rodents, lizards, and snakes. It is unquestionably a perfectly harmless species, if not actually a beneficial one, from an economic standpoint.

"The eggs of this species are usually two or three in number and are ordinarily deposited from the middle of May to the latter part of June. But one brood is raised in a season. The same nest is often used from year to year, when not disturbed, the necessary repairs required being made each season. The first eggs of this species deposited in the U. S. National Museum collection, were obtained through Mr. C. S. McCarthy, who found several of their nests on the Canadian River in the Indian Territory, between June 5 and 21, 1862.

They are rounded ovate in shape, pale bluish white in color, and unspotted; the type specimen, however, shows a few minute deeper blue shell markings, not usually found in the eggs of this species. They are frequently badly stained by contact with the decaying green leaves on which they are usually placed.

The average measurement of twenty-nine eggs of the Mississippi Kite is 41 by 34 millimetres. The largest egg in the U. S. National Museum collection, measures 44.5 by 36.5, the smallest 39 by 32 millimetres.

The type specimen, one of a set of two (No. 23160, Pl. 5, Fig. 5), was taken by Col. N. S. Goss, in Barber County, Kansas, May 31, 1887.

[1]Nests and Eggs of North American Birds, Davie, 1889, p. 166.

## 63. Rostrhamus sociabilis (Vieillot).

EVERGLADE KITE.

*Herpetotheres sociabilis* Vieillot, Nouveau Dictionaire, xviii, 1818, 318.
*Rostrhamus sociabilis* D'Orbigny, Voyage; Oiseaux, ii, 1847, 73.
(B 37, C 334, R 429, C 490, U 330.)

Geographical range: Whole of tropical America, except part of West Indies; south to Argentine Republic and Ecuador; north to Florida and Atlantic coast of Mexico.

The Everglade Kite, a common South American species, has but a very restricted range within the United States, being a resident of the swamps and marshes of southern Florida, and said to be fairly abundant in the Everglades. It breeds in suitable localities throughout these little known regions.

Messrs. Sclater and Hudson say: "This Hawk in size and manner of flight resembles a Buzzard, but in its habits and the form of its slender and very sharply hooked beak it differs widely from that bird. The name of the 'Sociable Marsh Hawk,' which Azara gave to this species, is very appropriate, for they invariably live in flocks of from twenty to a hundred individuals, and migrate and even breed in company. In Buenos Ayres they appear in September and resort to marshes and streams abounding in large water snails (*Ampullaria*), on which they feed exclusively. Each bird has a favorite perch or spot of ground to which it carries every snail it captures, and after skillfully extracting the animal with its curiously modified beak, it drops the shell on the mound. When disturbed or persecuted by other birds they utter a peculiar cry, resembling the shrill neighing of a horse. In disposition they are most peaceable, and where they are abundant all other birds soon discover that they are not like other Hawks and pay no attention to them. When soaring, which is their favorite pastime, the flight is singularly slow, the bird frequently remaining motionless for long intervals in one place, but the expanded tail is all the time twisted about in the most singular manner, moved from side to side, and turned up, until its edge is nearly at a right angle with the plane of the body. * * *

"Concerning its breeding habits, Mr. Gibson writes: 'In the year 1873, I was so fortunate as to find a breeding colony in one of our largest and deepest swamps. There were probably twenty or thirty nests placed a few yards apart in the deepest and most lonely part of the whole 'cañadon.' They were slightly built platforms, supported on the rushes and 2 or 3 feet above the water, with the cup-shaped hollow lined with pieces of grass and water rush. The eggs never exceeded three in a nest; the ground color generally bluish white, blotched and clouded very irregularly with dull red brown, the rufous tint sometimes being replaced with ash gray.'"[1]

Mr. C. J. Maynard describes a nest found by him in the Everglades, which was placed in a magnolia bush about 4 feet from the water, as quite flat and

[1] Argentine Ornithology, 1887, Vol. ii, pp. 72, 73.

about a foot in diameter. It was composed of sticks, carelessly arranged, lined with a few dry heads of saw grass, and contained one egg. Upon dissecting the female, which was shot at the same time, another egg was found just ready to be laid; this was unspotted, and of a blue color throughout. Several sets of these eggs were brought to him subsequently by Seminole Indians.[1]

Mr. E. W. Montreuil, in a letter published by Mr. H. B. Bailey, describes the breeding habits of this species as follows: "This bird (*Rostrhamus sociabilis*) is found in numbers in the Everglades of Florida, especially on the east side. They lay their eggs early in March, but some pairs later than others, as the set you have were taken March 16, and were fresh, while all the other nests had young in them. When they breed a male and female are by themselves, always near a small island, which they make their rendezvous, and while resting on a branch they can have an eye on their nest for enemies, especially Crows, who rob their nests whenever they can. Around some of the islands there are several pairs of *Rostrhamus*, but they always place their nests a few acres apart from each other. * * * They built their nests with dry branches and grasses, attached to saw grasses about 12 inches below the tops, just so as to be out of sight. They measure about 12 inches in diameter and 6 inches high, and the cavity is about 3 inches deep. They lay two or three eggs. The old birds usually bring their throats full of the animals of the Everglade shells, but sometimes they bring the animal in the shell, as many of the nests contained a lot of these shells. While they have young they are not wild, flying over one's head when near the nest."[2]

Mr. J. F. Menge, who found the Everglade Kite nesting near Meyers, Florida, writes me "They generally lay but two eggs, commencing to nest as early as March 1, and up to the end of April. Their favorite nesting sites are swamps, overgrown with low willow bushes, the nests usually being placed about 4 feet from the ground. They frequent the borders of open ponds and feed their young entirely on snails. According to my observations the female does not assist in the building of the nest. I have watched these birds for hours. She sits in the immediate vicinity of the nest and watches while the male builds it. The male will bring a few twigs and alternate this work at the same time by supplying his mate with snails, until the structure is completed. They feed and care for their young longer than any other birds I know of, until you can scarcely distinguish them from adults."

A nest of this species now before me, taken by Mr. Menge, and kindly forwarded, measures 16 by 13 inches in diameter, and is about 8 inches thick. It is not an artistic looking structure, but rather carelessly put together. The base consists of dry willow twigs, some of them half an inch in diameter; the greater portion are, however, smaller. The inner cavity is about 7 inches wide by $1\frac{1}{2}$ inches deep. This is lined with small stems of a vine and a few willow leaves. The latter look as if the twigs, to which some of them are still

[1] Birds of Florida and Eastern North America, 1881, pp. 284–290.

[2] Auk, Vol. I, 1884, p. 95.

attached, might have been broken off by the birds while green; the first mentioned material predominates in the lining. This nest was found on April 3, and had just been finished. On April 23, it was visited again, and it then contained two eggs, in which incubation was so far advanced that they could not be saved.

From the foregoing accounts it will be seen that the nesting sites selected by these birds are rather variable, and that while in some sections in South America they may be said to breed in small colonies, this does not appear to be the case in Florida, at least as far as we know at present. The food of this species in Florida, about which all observers agree, seems to consist entirely of a fresh water snail, *Pomus depressa* (Say), and according to Mr. W. E. D. Scott, the local name of the Everglade Kite in the vicinity of Panasofka Lake, where he found them very abundant during the month of March, 1876, is "Snail Hawk."

The number of eggs is two or three, and these seem to be deposited from the latter part of February till the 1st of May, usually in March or the beginning of April.

In shape they vary from a rounded ovate to oval. The ground color is pale greenish white. In some specimens this is scarcely perceptible, the whole surface of the egg being covered with rusty or brownish red blotches and smears of different degrees of intensity, and running into each other, hiding it completely. None of the markings in the majority of specimens before me are well defined, except in a single one. In this case the ground color is distinctly visible, the egg being but slightly marked, principally about the center. These markings are well defined in the shape of small irregular blotches connected with each other by lines and scrawls similar to those found on the eggs of the Grackles. They vary from fawn color to light brown.

The average measurement of six specimens is 44.5 by 37 millimetres. The largest egg measures 47 by 37.5, the smallest 42 by 37 millimetres.

The type specimen (No. 16827, U. S. National Museum collection) was taken in the spring of 1873, in Florida, by Mr. C. J. Maynard. It is figured on Pl. 5, Fig. 6. Another, from a set of three eggs taken by Mr. E. W. Montreuil, March 16, in the Everglades of Florida, was kindly loaned by the American Museum of Natural History, New York City, for the purpose of figuring. It is the lightest colored egg of this species I have seen. This is figured on Pl. 5, Fig. 7.

## 64. Circus hudsonius (Linnæus).

MARSH HAWK.

*Falco hudsonius* Linnæus, Systema Naturæ, ed. 12, I, 1766, 128.
*Circus hudsonius* Vieillot, Oiseaux, Amerique Septentrionale. 1, 1807, Pl. 9.
(B 38, C 333, R 430, C 489, U 331.)

Geographical range: North America in general, south in winter to Panama, Bahamas, and Cuba.

The Marsh Hawk, also called the Harrier and Mouse Hawk, is one of the best known of the Raptores found within the limits of the United States.

Its breeding range extends over nearly the entire North American continent. In portions of the South Atlantic States it must, however, be considered as a rather rare summer resident, and in certain sections of this region, like the Piedmont hill country of South Carolina, according to Dr. Leverett M. Loomis, it does not breed at all, and I think the same remarks apply to the greater part of Florida, where only a few remain during the summer, principally in the northern parts of the State. It is a fairly common summer visitor in the Arctic regions, and east of the Rocky Mountains winters regularly as far north as latitude 39°, while on the Pacific coast I have found a few remaining in latitude 46°. It is likely, however, that these birds bred farther north and wintered here, and that the actual summer residents migrated south, and were, to a certain extent, replaced by these visitors from colder regions.

The Marsh Hawk is easily recognized by the conspicuous white patch at the base of its long tail, and its great stretch of wing, while flying, makes it appear a much larger bird than it really is. In the South Atlantic States it is by no means as common during the breeding season as in the more northern portions of its range.

On the extensive prairies of the West, it is a familiar sight to see a pair, and often several, of these birds skimming close to the ground, now along the borders of a meadow, or the shrubbery found close to the banks of small streams, and the tule covered borders of fresh or salt water marshes, actively engaged in search of their prey. From the fact that even in winter one frequently sees pairs of these birds hunting in company as often as singly, I am inclined to believe that many remain mated throughout the year.

Its flight is singularly easy and graceful. One moment it may be seen sailing or drifting along before a strong breeze without an apparent movement of its wings, in the next it may raise or lower itself or turn completely over, in undulating motions; dropping suddenly in the grass, or staying suspended in the air over some point which might be suited to the location of its intended quarry.

Its food consists principally of meadow mice, small ground squirrels, and other rodents, frogs, grasshoppers, locusts, and, in portions of the West, the

large and destructive crickets (*Anabus simplex*); where these are abundant they feed almost exclusively on them. Now and then small birds or snakes are also eaten, probably when other food is not so easy to obtain. It is an extremely useful bird, and well deserves the fullest protection.

According to Mr. W. G. Smith, of Loveland, Colorado, the Marsh Hawk will occasionally feed on decaying animal matter, such as dead Ducks, and will kill and devour such game when found wounded.

Dr. W. L. Ralph tells me: "In Florida I have often had these birds come at the report of my gun and try to carry off the ducks that I had shot, and sometimes they would be so persistent that I could almost catch them before they would leave. I saw a couple of these birds on March 27, and another pair on March 28, 1891, a few miles from San Mateo, Florida. Still another pair was seen by one of my men on the last day of that month, and I think that is rather late for them to be so far south, unless they were going to nest. Sometimes they will fly just in front of the blaze of a forest or prairie fire to catch the small mammals driven out by the heat."

In the West, where I have principally observed these birds, they are not very shy, often sailing in search of food quite close to a person. Sometimes they seem to be so entirely absorbed in such occupation that I frequently had them pass within 20 feet without apparently seeing me, and, after noticing me, turning only a little out of the way and altering their course but very slightly.

The mating season begins about April 1, sometimes earlier. Pairs of these birds may be seen at this time playing with each other, sailing around in graceful gyrations, turning over and over, and uttering shrill screams of delight while engaged in these aërial evolutions. Soon thereafter a suitable nesting site is selected, and this is always on the ground or close to it. It is usually not far from water, in a thick bunch of grass, on a slight hillock in a marsh, in bunches of rank weeds, low bushes, among rushes, flags, or on tule drifts. The male assists faithfully in the construction of the nest, which, in most cases, is but a slight affair. Now and then one is found somewhat more elaborately built than the average, but, as a rule, there is but little material used, and the inner lining is also generally rather scant. A reasonably level surface in the high grass or thick bushes having been selected for this purpose, bits of dry grasses, stubble, or pieces of weed stalks are carried to the site, and this is arranged in a circle, leaving a rather shallow cavity in the center, lined with similar material, and the eggs are deposited on this. Occasionally, especially when placed in wet places subject to overflow, the nest proper is put on a slight platform of sticks to raise it slightly from the ground. I have never found a nest lined with either hair or feathers, excepting such as drop from the sitting bird.

In the Southern States nidification begins in the early part of April; in the Middle States usually about the second week in May, rarely earlier, and correspondingly later northward, where it is protracted till the first two weeks in June. When not disturbed the same sites are resorted to from year to year,

and in such cases the nests are frequently bulky affairs. The usual number of eggs laid by this species is from four to six, rarely more.

Mr. John Swinburne writes me that in Arizona the usual number of eggs found by him is two or three. I found a nest near the Laguna, 9 miles from Tucson, Arizona, with two newly hatched young and an egg about to hatch. I also took a much incubated set of three eggs near Fort Lapwai, Idaho, June 15, 1871. As an offset to such small sets, I had the good fortune to find one of eight, near Walla Walla, Washington, on May 8, 1882. The nest was placed in a pasture, close to a small stream, alongside of and concealed by a tall bunch of rye grass. It was principally constructed of dry grasses carelessly arranged. The eggs were in different stages of incubation, five contained large embryos that required rotting out, one was quite fresh, and two nearly so.

The earliest date on which any of the eggs were taken among the series of this species in the U. S. National Museum collection is April 29, 1837, collected by Audubon, near Galveston, Texas. On the Pacific coast the Marsh Hawk lays in the beginning of April, and even at Camp Harney, Oregon, I have taken their eggs on April 29, 1877.

In Connecticut they nest usually between May 15 and 25. Mr. John N. Clark, of Saybrook, writes me: "I observe that the female sits very closely and the male procures the food with great diligence. I have located the nests often by watching him. The moment he appears in sight the female utters shrill cries from the nest, and leaves it as he approaches, rising in the air to meet him, and seizing with dexterity the morsel that he drops in her talons. She then retires to the nest, to feed or distribute it to the young. I have examined the stomachs of several specimens, and found meadow mice, their favorite food. One I examined contained not less than eleven, another nine, and nothing else. I have rarely seen them disturb domestic fowls. I have reared these birds from the nest, to study their habits, and have found them very interesting, though never becoming very gentle pets. They showed a decided fondness for frogs and mice of all kinds, and they rarely declined fish."

Mr. J. W. Preston, of Baxter, Iowa, writes me: "The nests of the Marsh Hawk are usually built of weeds and grass, but I remember seeing one placed on a tussock over water, which was bulky and well made. The foundation consisted of plum twigs and small branches. It was thick, the depression deep, and was well lined with grass and down. They nest here sometimes on the highest ridges. Their call note is a peevish scream, not unlike that of the Red-tailed Hawk, though not so strong. A peculiar clucking or cackling, in a short jerky way, is also uttered at times, while ascending in the air. This seems to be done for diversion. The male assists in incubation, and I have seen him reluctant to abandon the nest to its mate. The earliest date on which I have found these birds nesting here was April 20. In a set of eight found by me the eggs ranged from fresh to well incubated. This nest was placed in a low hazel thicket, on a high ridge."

Mr. Lynds Jones, of Grinnell, Iowa, says: "Once during the breeding season I saw a male catch a large garter snake and fly up with it several hundred feet, then drop it to the female, who just then came flying along near the ground; she caught and carried it to the nest, followed by the male."

Mr. George G. Cantwell found a nest of this species placed on a haycock.

The male assists to a certain extent in incubation, which lasts somewhat over three weeks, and seems to begin, occasionally at least, before the complete set of eggs is laid. Both parents assist in caring for the young, and the family remains together for sometime after they leave the nest. The young when first hatched are covered with a grayish buffy down. But one brood is raised in a season.

The eggs, commonly from four to six in number, and usually laid at intervals of two and three days, are pale greenish or bluish white in color, and the majority are unspotted. Quite a number, however, are more or less blotched and spotted with pale buff and brownish markings. About two-fifths of the series are more or less plainly marked. The shell is smooth and slightly glossy. In shape these eggs vary greatly, ranging through the different forms of ovate.

The average measurement of seventy-three specimens in the U. S. National Museum collection is 46 by 36 millimetres. The largest egg in the series measures 52 by 38 millimetres; this was taken on the Lower Anderson River, Arctic America, by Mr. R. MacFarlane, of the Hudson Bay Company. The smallest of the series measures 43 by 34 millimetres, and was taken by the writer near Fort Walla Walla, Washington.

Of the type specimens figured, No. 13249 (Pl. 5, Fig. 8), a single egg, was taken in Maine by Dr. B. Dixon; No. 20686 (Pl. 5, Fig. 9), from a set of five eggs, four of which are distinctly spotted, was taken near Fort Lapwai, Idaho, May 14, 1870; and No. 20690 (Pl. 5, Fig. 10), from a set of eight eggs, was collected near Fort Walla Walla, Washington, on May 8, 1882. The last two types are from the Bendire collection.

## 65. Accipiter velox (Wilson).

SHARP-SHINNED HAWK.

*Falco velox* Wilson, American Ornithology, v, 1812, 116, Pl. 45, Fig. 1.
*Accipiter velox* Vigors, Zoölogical Journal, i, 1824, 338.
(B 17, C 338, R 432, C 494, U 332.)

Geographical range: North America in general, south in winter to Guatemala.

The Sharp-shinned Hawk breeds throughout the entire United States, but in the more southern portions, excepting the mountain regions, it must be considered as a rather rare summer resident. The only eggs of this species from the South in the U. S. National Museum collection are two, said to have been taken near Edinburg, Texas. Mr. Würdemann has found it nesting in Florida, and Mr. G. E. Beyer informs me that it is a summer resident in southern

Louisiana, having shot it there in July. In the Middle and Northern States it is fairly common in suitable localities, and the same holds good in the Rocky Mountain region and the mountains of the Pacific coast, where it is known to breed from California to Alaska. It is not uncommon in the higher mountain regions of Arizona, and has been met with in similar localities in Lower California.

It seems to be a regular summer visitor throughout the southern portions of the Dominion of Canada, while in the interior of British North America it breeds at least as far north as latitude 62°; Mr. R. Kennicott taking its nest and eggs near Fort Resolution, on the shores of the Great Slave Lake, on June 16, 1860, and Mr. J. Lockhart, of the Hudson Bay Company, found it breeding in the same locality in June, 1863. The eggs taken by these gentlemen are in the U. S. National Museum collection. Mr. B. R. Ross noticed it also at Fort Simpson on the Mackenzie River, in about latitude 63°.

In the northern portions of their range they are only summer residents, a few wintering as far north as latitude 40°, the majority passing farther south. The southward migration takes place in the latter part of September and the beginning of October. Dr. A. K. Fisher tells me of having seen several hundred of these birds at this time in one day's tramp, the majority of them flying high. They return to their summer homes about the latter part of March or the first days in April.

The Sharp-shinned Hawk, though small in size, is full of dash and courage, frequently attacking birds as large as itself and killing them with ease. Like its larger relatives, the vicious Cooper's Hawk and Goshawk, it has very destructive instincts. It lives mostly on small birds, but occasionally on some fully as large as itself—among these, Pigeons, Bob Whites, Mourning Doves, Purple Grackles, and Robins may be mentioned. Small rodents appear to furnish but a very limited portion of its food, and insects are likewise rarely eaten.

Although the wings of the Sharp-shinned Hawk are rather short, its flight when in pursuit of its prey is unerring and exceedingly swift. No matter which way the selected victim may turn and double, his untiring pursuer is equally prompt, and only rarely will it miss capturing its quarry. Once struck, death fortunately follows quickly, as it fairly transfixes its victim's vitals with its long and sharp talons.

It is said to be rather fond of young pullets, and does not hesitate to help itself to these as long as one is left. It is one of the few species that must be considered as more harmful than beneficial, looked at from an economic point of view.

Mr. William L. Ralph writes me that "Sharp-shinned Hawks are quite common in the northern part of Oneida County, New York, and do not seem to decrease in numbers so fast as other Hawks; which is partly due to their retiring habits, and again to their quick movements, which make it difficult to shoot them. They do not, like most other Hawks, circle through the air

in search of food, but skulk around in thick trees and bushes and pounce on their prey when least expected. When they seize a bird or mammal, no matter how small it may be, they always fly at once to the ground with it. When they wish to carry their prey to any distance, they do it by short flights just above the ground. They have a peculiar habit of stretching out their legs as far as they can, as soon as they seize their quarry, as if they were afraid of what they had caught. Their food, according to my observation, consists principally of mice and other small mammals, as well as of small birds, but in this region they kill very few of the latter.

"The only call note I have ever heard the Sharp-shinned Hawk utter sounds very much like the "cac, cac, cac" of the Flicker, and is exactly like that of the Cooper's Hawk, excepting perhaps, that it sounds a little shriller and not quite so loud. These birds resort to the woods, thick with evergreen trees, during the breeding season, but at other times they are often seen in the open, especially in swampy places, where they prey on mice and moles, usually common in such situations. I have often seen them in Florida during the winter, but have never found them breeding there. Southern people call this Hawk the 'The Little Blue Darter,' and Cooper's Hawk the 'Big Blue Darter.'

"The nests of the Sharp-shinned Hawk are usually very large for the size of the bird, so much so that it is impossible by looking from the ground to tell whether one is occupied or not. They measure sometimes from 25 to 30 inches in diameter and from 4 to 6 inches in depth on the outside, and from 10 to 12 inches in diameter by from 2 to 4 inches on the inside. They are placed in evergreen trees, usually against the trunk, on branches growing out from it. I have never found one in any other situation. The nest is generally made of large twigs and lined with small ones, but sometimes a few pieces of hemlock bark, or a few strips of the inner bark, or a little of both, are added to the lining. They are situated from 25 to 50 feet above the ground, usually about 40 feet. The nests are evidently made by the birds themselves, as I know of no other species that builds exactly like them.

"In this locality Sharp-shinned Hawks commence laying about the middle of May, and fresh eggs can be found from that time until the 1st of June. The male may assist in incubation, but I think not, for I have found a number of their nests and some of them I visited several times, but every time that I could make sure of the sex of the bird it proved to be the female. I have, however, seen the male bring food to its mate while she was incubating.

"I have never known of but one instance here in the North of a nest belonging to birds of prey being defended by its owners, and this was a nest owned by a pair of this species, that was found during the present season, 1890. Usually, when a nest of these birds is disturbed, the female will fly around among the trees some distance away and utter her Flicker-like cries, while the male will keep out of sight altogether. This nest was found on May 9, and even then the female was quite angry and struck at the climber several times,

although she had laid but three eggs. On May 16, Mr. Egbert Bagg and I went to collect the eggs, and on our arrival found the female sitting and the male just flying to the nest with a mole in his claws. As we reached the foot of the tree the female flew to a limb near by and the male disappeared from view, and till the climber reached the nest the only demonstration made by either was the cry uttered by the female. Nevertheless she was fierce enough then, striking at him every few seconds while he was in the tree, a period of about a quarter of an hour, except in a single instance, when she hurt herself by flying against a limb, which kept her quiet for two or three minutes. During the last half of the fight the male took part and struck at the climber as determinedly as his mate. This is the only time I have ever known a male of this species to make any kind of demonstration while its nest was being robbed. The set of eggs belonging to this pair of Sharp-shinned Hawks is the earliest I have ever found. The nest was peculiar, much deeper than usual, measuring about 7 inches in depth on the inside, while the majority are generally quite shallow in comparison with the diameter. This little Hawk is not uncommon in portions of St. Johns and Putnam Counties, Florida, during the winter, and I think that a very few remain to breed. The native hunters say that they stay during the summer, and I have spoken with some that claim to have found their nests. The latest date on which I saw any of these birds during the season of 1891 was March 26. Like the Marsh Hawk, they will sometimes fly just in front of a forest or prairie fire to catch the small mammals that are driven out by the heat."

Mr. J. H. Sage found a nest of this species containing four fresh eggs in a small white pine tree, in a grove of these trees and hemlocks, near Portland, Connecticut, May 30, 1889. This nest was composed entirely of pine and hemlock sticks and twigs; it was saddled on the base of a limb and built partly around the trunk of the tree. The nest was 8 inches thick, 30 inches in longest and 23 inches in shortest diameter; the depression for the eggs was very slight; it was 48 feet from the ground. The female was on the nest and was shot as she flew from it; she was in the young plumage. The male was flying about, continually uttering the peculiar cry of this species. The Sharp-shinned is one of the most abundant Hawks in the vicinity of Portland, and is seen occasionally in the winter.

Mr. Lynds Jones, of Grinnell, Iowa, found eggs of this species on May 2, and writes me "that in this locality they breed occasionally in hollows in 'American lindens,' and in such cases the nest is made of the inner bark of this tree and of the wild grapevine, with a lining of grass and feathers. When built in a tree (an open nest) sticks are used. It generally chooses limbless trees, most frequently oaks, to nest in, from 15 to 60 feet up. I believe the female alone incubates, from the fact that at this time the male only is seen searching for food."

In the vicinity of St. Johns, New Brunswick, Mr. J. W. Banks says this species nests usually in the latter part of May and the beginning of June;

the nests being placed against the trunks of spruce and fir trees, at a height of about 30 feet. He found two fresh eggs on one occasion, May 5, 1880; and on May 8 the nest contained four eggs, but this is unusually early for this locality. Their call note is a clear "chee-up, chee-up."

In the West, in Oregon, Washington, and Idaho, these birds are not very common, and I found only two nests. One on Craig's Mountain, near Fort Lapwai, Idaho, May 24, 1870, was in a spruce grove, in a tree of this species, close to the main stem, and about 20 feet from the ground; it contained four nearly fresh eggs. The nest was composed of small twigs of the service-berry bush, rather shallow, and contained no lining of any kind.

Another nest of this species was taken by me near Fort Klamath, Oregon, May 18, 1883, containing five handsome fresh eggs. This was composed entirely of fine willow and sage bush twigs, none thicker than a lead pencil, and evidently selected with care as to size. The nest was about 20 inches in diameter outside by 7 inches deep, and placed in the top of a small bushy black pine, close to the main trunk about 25 feet from the ground. In both instances the birds themselves betrayed the location of the nests by their solicitous actions. The females were in each case noisy and demonstrative, and the owner of the last nest swooped twice pretty close to me, screaming fiercely at the same time. This nest was shallow and contained no lining, but was very compactly and strongly built, and well hidden by the lower branches.

According to Mr. C. F. Morrison this species breeds in abandoned Magpies' nests along the La Plata River in Colorado; and three eggs taken by him near Fort Lewis, Colorado, on June 22, 1886, now in the U. S. National Museum collection, were said to have been deposited in a dilapidated nest of a Magpie, the arched roof of which had fallen upon the main nest, forming a hollow, which was lined with a few feathers upon some dead leaves which had partially filled it the fall before.[1]

Occasionally the Sharp-shinned Hawk is said to nest in cliffs, and while this may possibly be of more frequent occurrence in the Arctic regions, where the habits of our birds are not as well known as one could wish, such nesting sites, as well as those in hollow trees, must, in the United States at least, be considered as decidedly rare and exceptional. The Sharp-shinned Hawk nests in evergreens from choice, and if these be absent, it may resort to a birch, an oak, a maple, chestnut, or hickory tree; if any conifers are found in the vicinity of their breeding grounds it invariably nests in these. It is a late breeder, in fact one of the tardiest of our Raptores. As a rule the eggs are seldom laid earlier than the first week in May, usually in the last half of this month, and not infrequently in June. A set of four was taken as late as May 20, near Washington, D. C.

The nests of this species are usually fairly well constructed, better than those of the majority of our Raptores, and it generally builds its own nest, seldom using those which have been abandoned by other species.

[1] Ornithologist and Oölogist, ol. XII, 1887, No. 2, p. 27.

The usual number of eggs laid by the Sharp-shinned Hawk is four or five; larger sets are rare. Mr. C. L. Rawson, of Norwich, Connecticut, took a set of seven on June 1, 1881. Aside from the unusually large number of eggs, the situation of the nest from which they were taken was also rather remarkable, being placed in a low pine, only 10 feet from the ground.

The eggs are laid at intervals of one and two days, and incubation does not commence till the set is complete; the female guarding her nest constantly, however. Incubation lasts probably about three weeks, and the male does not appear to assist in this duty, but supplies the food for his mate during the time. The young, when first hatched, are covered with white down and grow rapidly. But one brood is raised in a season.

The shape of these eggs is nearly a perfect oval; an occasional specimen may be called short ovate. The ground color is usually a pale bluish or greenish white, which fades with age into a dull gray white. In a few specimens the ground color is almost completely hidden by confluent markings of cinnamon-rufous.

The eggs are mostly heavily blotched, spotted, and marbled with various shades of brown, the darker of these tints predominating; these are again mixed with different shades of drab, fawn color, lavender, and clay color. The different patterns of markings are endless in variety, in some specimens they are heaviest on the larger, in others the smaller end; in a few they are disposed in the shape of a wreath in the center, leaving both ends of the egg nearly unspotted. In others, again, they are pretty evenly distributed over the entire egg, and a few are almost unspotted. Finally, in some specimens, the markings run into each other, giving the egg a clouded appearance.

The average size of fifty specimens in the U. S. National Museum collection is 37 by 30.5 millimetres. The largest egg measures 39 by 32, the smallest 35 by 29 millimetres.

Of the type specimens, No. 20675 (Pl. 5, Fig. 11), selected from a set of three eggs, was taken in Massachusetts, May 29, 1875; No. 20677 (Pl. 5, Fig. 12), from a set of four, taken June 1, 1878, near Eastford, Connecticut; No. 20679 (Pl. 5, Fig. 13), from a set of five, taken at Fort Klamath, Oregon, May 18, 1883; No. 20680 (Pl. 5, Fig. 14), taken May, 1879, at Blue Ridge, Pennsylvania; all from the Bendire collection. No. 21042 (Pl. 5, Fig. 15), from an incomplete set of two, taken near Edinburg, Texas, in 1878, from the Merrill collection. No. 22812 (Pl. 5, Fig. 16), from a set of four, taken near Redding, California, by Mr. L. W. Green, May, 1886; and No. 23566 (Pl. 5, Fig. 17), from a set of three taken by Mr. Charles F. Morrison, near Fort Lewis, Colorado, June 22, 1886.

## 66. Accipiter cooperi (Bonaparte)

COOPER'S HAWK.

*Falco cooperi* Bonaparte, American Ornithology, II, 1828, 1, Pl. x, Fig. 1.
*Accipiter cooperi* Gray, List of Birds in British Museum, Accipitres, 1844, 38.
(B 15, 16, C 339, R 431, C 495, U 333.)

Geographical range: Whole of temperate North America, including the greater part of Mexico.

With the exception of Alaska, the breeding range of the Cooper's Hawk is coextensive with the limits of the United States. It is known to breed from Maine to Florida, from Louisiana and Texas throughout the interior, and on the Pacific coast from northern Lower California (Cape Colnett, latitude 31°), to our northern border. It is also met with along the southern portions of the Dominion of Canada, from Newfoundland and New Brunswick westward to Manitoba, where it is reported as tolerably common in the vicinity of Winnipeg, up to latitude 50°, and stragglers probably reach points still farther north, as Dr. T. M. Brewer reported it from the Saskatchewan. It also occurs in British Columbia, both on the coast and in the interior, and undoubtedly breeds there as well. In the more northern portions of its range it is only a summer resident, wintering from about latitude 39°, southward, and passing into Mexico. It breeds most commonly in the Middle and Northern States, becoming rarer as the extreme limits of its northern and southern range are reached.

Cooper's Hawk must be considered as one of the few really injurious Raptores found within our limits, and as it is fairly common at all seasons throughout the greater part of the United States, it does, in the aggregate, far more harm than all other Hawks. It is well known to be the most audacious robber the farmer has to contend with in the protection of his poultry, and is the equal in every way, both in spirit and dash, as well as in bloodthirstiness, of its larger relative, the Goshawk, lacking, however, the strength of the latter, owing to its much smaller size. It is by far the worst enemy of all the smaller game birds, living to a great extent on them as well as on small birds generally.

It does not appear to be especially fond of the smaller rodents; these, as well as reptiles, batrachians, and insects seem to enter only to a limited extent into its daily bill of fare, and unfortunately it is only too often the case that many of our harmless and really beneficial Hawks have to suffer for the depredations committed by these daring thieves.

The flight of Cooper's Hawk is both easy and graceful, and ordinarily not especially swift. He may most often be seen skimming along close to the ground, in rather a desultory manner, usually skirting the edges of open woods or clearings; but once in sight and in active pursuit of its selected prey it darts in and out through the densest thickets with amazing swift-

ness, where it would seem impossible for it to follow successfully; especially is this the case when chasing some small bird that generally tries to take refuge in such places. It manages, however, with the assistance of its long tail, which helps it very materially, to turn suddenly and double with remarkable ease, even in dense undergrowth, arresting its flight instantly, and darting off, perhaps, at a right angle the next second to capture its selected victim.

The favorite haunts of Cooper's Hawk are moderately timbered districts, interspersed with cultivated fields and meadows, but it is also found in the more extensive and heavily wooded mountain regions, and in the West on the open and almost treeless prairies. It is more or less migratory throughout its range, excepting in the extreme southern parts, where it is perhaps a constant resident. Birds nesting in the northern half of the United States I believe migrate regularly, and are replaced by others coming from points still farther north, which would naturally lead to the belief that they were constant residents when this is not the case.

In the Middle States they usually return from their winter haunts about March 15, and by the end of the month they are located again on their breeding grounds, which are generally resorted to from year to year by the same birds, if not persistently disturbed.

As a rule I believe a new nesting site is selected each season at no great distance from that of the previous year, but occasionally the old one is resorted to for successive seasons. In the choice of these, old Crows' nests when available are given the preference, but larger Hawks' nests, as well as those of squirrels, are frequently used. When they build nests of their own they are usually placed between the diverging limbs in a crotch of the tree or saddled on some smaller limb close to the trunk. This last is most often the case when they nest in thick and bushy conifers. No preference seems to be given to any particular kind of tree, and their nests are generally found at no very great height from the ground, ranging from 20 to 50 feet up, rarely lower or higher.

Their nests vary considerably in bulk, according to the locations in which they are placed, and are composed of sticks lined with finer twigs, and scattered among these are generally found small scales and flakes of the outer bark of different species of trees, those of the yellow pine being preferred when obtainable. Nests built by the birds themselves compare favorably with those of other Raptores.

On the plains, where, from scarcity of suitable timber elsewhere, they are confined to the shrubbery of the creek bottoms, consisting mainly of cottonwoods and willows, they sometimes nest as low as 10 feet from the ground, and I have here found some of their nests fairly well lined with the dry inner bark of the cottonwood and with weed stalks; while in the vicinity of Grand Forks, North Dakota, according to information furnished me by Mr. G. G. Cantwell, they are said to nest occasionally directly on the ground.

Even in the more southern parts of their range nidification rarely begins before April 15. In the southern New England States, as well as in New York, Pennsylvania, Indiana, Michigan, Minnesota, Nebraska, Cooper's Hawk occasionally begins laying about May 1, but usually not before the second week of this month and frequently later. Even in Lower California and southern Arizona it rarely lays as early as April 20, and in the mountain regions of Colorado and Montana the time is protracted until the beginning of June.

Mr. Denis Gale, of Gold Hill, Boulder County, Colorado, writes me: "On June 25 I found a nest of a Cooper's Hawk containing four unmarked bluish white eggs, resting upon some thin flakes or scales of spruce bark, which alone constituted the lining of the nest, the available contrivance for which was a large bunch of matted scrub, an excrescence upon a horizontal limb, about 18 inches from the trunk and about 20 feet from the ground. This bunch consisted of a wonderful growth of very densely interlaced twigs, the surface of which offered a commodious nesting site, having not only an ample flat area, but a sufficient depression in its center to meet every requirement for a nest. On July 2 these four eggs were represented by four bright lively Hawklets, densely covered with white down. Neither food nor feathers of any kind were found in or about the nest. The character of this species is bold and brave, especially so in defense of its young. It has a rapid and graceful flight. The skill with which it pursues its devious path along a creek bottom, noiselessly following the intricate opening close to the ground through the trees and undergrowth is remarkable.

"From the date at which they have their young to provide for, until late in the season, this seems to be their favorite mode of hunting, but especially is it so after the hen Grouse, accompanied by her young brood, has sought such localities for food and water, and where they loiter throughout the summer."

On the Pacific coast, in Oregon, Washington, and Idaho, I found Cooper's Hawk rather rare, while in southwestern Montana it is more abundant than any of the other Raptores. It is also common in Arizona

Throughout the greater part of the year Cooper's Hawk is usually a silent bird and rarely utters any notes, but during the mating season it frequently emits a cackling or chattering sort of noise, also a note something like "tick, tick" frequently repeated. When disturbed on the nest, it usually screams shrilly and violently, but generally flies off and watches proceedings from a safe distance. Others, however, show a good deal of courage at times, and boldly dash at the intruder.

As far as known only a single brood is raised in a season, incubation lasting about twenty-four days, the male assisting to a slight extent only in these duties, but keeping its mate supplied with food. The number of eggs laid varies from two to six. In the more southern parts of its range it usually lays three or four, and sometimes but two eggs, while along our northern border and the southern New England States, they range from four to six in number, sets of five being rather common.

Cooper's Hawks are persistent layers The loss of their first set does not at all discourage them; in due time they will have a second, and if this is taken, even a third one, each one usually smaller in number than the first clutch. Some birds show great attachment to the original nesting site, and will continue laying in the same nest, even after being repeatedly robbed; others abandon the rifled nest each time and select a new site, generally in the same woods, however. Mr. C. J. Pennock records taking a set of four eggs from the nest of a Cooper's Hawk on April 24, 1874; May 5 two more eggs were taken from the same nest, and on May 11 two others. Later in the season (about August 1), on visiting the same locality, two young Hawks of this species were seen, but it is not known if they were reared in the old nest.[1]

The eggs of Cooper's Hawk are deposited at intervals of one or two days, and incubation does not begin until the set is nearly completed.

Their ground color varies from a pale bluish white to a greenish white tint, which fades out considerably in time Occasionally a much higher tinted set is found. Mr. C. J. Pennock has a set of five eggs in his collection, in which the ground color is a rich bright green, and four of these eggs are distinctly and handsomely marked. They were collected by himself near Kennett Square, Pennsylvania, May 2, 1887.

While many of these eggs are perfectly immaculate, fully one-half of those in the U. S. National Museum collection are spotted with irregular markings or scrawls of different shades of brown, drab, or fawn color. These markings, in most cases, are rather faint and irregularly scattered over the egg, usually heaviest about the larger end.

The average size of sixty-two eggs in the U. S. National Museum collection, from various parts of the United States, is 49 by 38.5 millimetres. The largest egg of this series measures 51.5 by 42, the smallest 43 by 34 millimetres.

Of the type specimens No. 23003, selected from a set of four eggs (Pl. 5, Fig. 18), taken by First Lieut. H. C. Benson, Fourth Cavalry, U. S. Army, near Huachuca, Arizona, May 12, 1887, shows the scrawls referred to above; and No 23306 (Pl. 5, Figs. 19 and 20), both from a set of five, taken by Mr. Jerome Trombly, near Petersburg, Monroe County, Michigan, May 14, 1885, show one of the better marked types, and an unspotted egg. Four eggs of this set are distinctly spotted. These eggs were taken from an old Crow's nest placed in the forks of a pin oak, a trifle over 40 feet from the ground. The Hawks had simply repaired the inside of the nest, and lined it slightly with a few dry leaves, a little moss, and shreds of bark.

[1] Bulletin Nuttall Ornithological Club, Vol. III, 1878, p. 41.

## 67. Accipiter atricapillus (Wilson).

AMERICAN GOSHAWK.

*Falco atricapillus* Wilson, American Ornithology, vi, 1812, 80, Pl. 52, Fig. 3.
*Accipiter atricapillus* Seebohm, History of British Birds, i, 1883, iv.
(B 14, C 340, R 433, C 496, U 334.)

Geographical range. Northern, central, and eastern North America; south in winter to the Middle States and southern Rocky Mountains, straggling west into Oregon (Fort Klamath).

The Goshawk, one of our handsomest birds of prey, breeds principally north of the United States, occurring more or less commonly, though nowhere abundantly, in suitable localities throughout the British Dominion, from the shores of the North Atlantic Ocean to the Arctic and Bering Seas.

Within the United States its breeding range is confined to the extreme northern border, breeding sparingly but regularly from central Maine northward, and probably also in the northern portions of Vermont, New Hampshire, and New York. In the Rocky Mountain region it is said to breed as far south as Colorado. West of the Rocky Mountains it occurs as a straggler only, but possibly breeds in limited numbers in the Bitter Root Mountains and the spurs thereof in Idaho. In eastern Washington and Oregon it is replaced by the western race, a much darker-colored bird. A typical specimen of *Astur atricapillus* has, however, been taken on the eastern slopes of the Cascade Range, near Fort Klamath, Oregon, by Dr. James C. Merrill, U. S. Army, on March 11, 1887, the most westerly record I know of. Throughout the United States it is by far more abundant during the winter months than in the breeding season. At this time it keeps more to the mountains, where game is abundant, while in the fall and winter it may often be seen in the fertile and cultivated valleys adjacent to these, in search of prey, and is naturally much more readily noticed. Five out of six of the birds seen at this time are the young of the year, which have been left by the parents to their own resources.

The Goshawk is the boldest and by far the most destructive of the North American Raptores; infinitely more injurious to our game birds, and the poultry yard as well, than any other species, the large Gyrfalcons not excepted. Notwithstanding its comparatively short wings, its flight is powerful and swift; it is strong and active in body, shy and keensighted, savage and bloodthirsty in disposition, a veritable terror to all smaller birds, and more than a match for others considerably larger than itself It loves to destroy life for the sake of killing. In northern Alaska, along the shores of the Yukon River, it is perhaps more abundant than anywhere else within its range, feeding principally on the numerous Ptarmigan, lemmings, and Arctic hares to be found there at all times in abundance.

Mr. L. M. Turner says: "The American Goshawk is a common species throughout the Yukon Valley, and apparently confines itself entirely to the

mainland, although plentiful along the seashore. Specimens were obtained from Fort Yukon, the Yukon Delta, and the vicinity of St. Michael. The tracts preferred by this Goshawk are the narrow valleys, borders of streams, and open tundras, which it constantly scans for Ptarmigan and small animals, the lemming forming a considerable portion of its food. It will sit for hours in some secluded spot waiting for a Ptarmigan to rise on its wings. No sooner does its prey rise a few feet from the ground, than with a few rapid strokes of the wing and a short sail, the Goshawk is brought within seizing distance; it pounces upon the bird, grasping it with both feet under the wings, and after giving it a few blows on the head they both fall to the ground, often tumbling several feet before they stop, the Hawk not relinquishing its hold during the time. * * * I have seen this Hawk sail, without a quiver of its pinions, until within seizing distance of its quarry, and suddenly throw its wings back, when with a clash they came together, and the vicinity was filled with white feathers floating peacefully through the air. I secured both birds, and found the entire side of the Ptarmigan ripped open. * * *

"It is a resident of the interior, and comes to the coast quite early in spring, as is attested by the fact that I killed one specimen April 28, and a fine example was brought to me from the mouth of the Uphún (part of the northern Yukon Delta) where it was killed April 25. It was a female, and contained an egg ready for extrusion, which had already received a pale bluish green color on the shell. The bird was shot on the nest which was placed in a small poplar tree. The nest was composed of sticks and a few blades of grass. The size was quite bulky, measuring nearly 2 feet in extreme diameter, and having but a slight depression. The bird was extremely vicious, choosing to remain on the nest rather than desert it. The male attacked the native, tore his cotton shirt into shreds, and snatched the cap from the head of the astonished man, who was so surprised at the impetuosity of the attack that he struck wildly at the bird with his arm, and before he could reload his gun the bird took flight.

"This Goshawk breeds wherever found in summer, placing its nest in a tree or shrub, or even on the edge of a cliff, inaccessible to foxes or other enemies."[1]

Mr. Manly Hardy, of Brewer, Maine, writes me: "According to my observations the Goshawk does more damage to game and poultry than all other hawks combined. They live almost entirely on Ruffed Grouse, domestic fowls, and rabbits. I have known one to destroy five Ruffed Grouse in one morning, tearing them to pieces and leaving them; and have also known one to tear out a Grouse's leg and hip and to swallow it whole, but never knew one to be taken with an empty crop.

"There is both an old and new nest of this species on my own land. The first about 140 yards from a blacksmith's shop. These are the only two I ever heard of having been found in this vicinity. I think they occupied the first

[1] Contributions to Natural History of Alaska, Turner, 1886, p. 157.

nest at least six or eight years, as ten or twelve adults and young were shot in the near vicinity; but so shy were they that no one ever suspected their nesting until the nest was accidentally found. A female was shot from it in 1877, and another in 1878. They then deserted the locality, and I have recently found where they rebuilt. The nesting sites were in both instances in white birches, about 20 feet from the ground. A very small young one was taken from the last nest June 5, 1887. They probably commence laying here about May 1."

Mr. J. W. Banks, of St. Johns, New Brunswick, writes me: "I know of two nests of the Goshawk taken in this vicinity. One nest about 10 miles away, and from which one of the parents was shot, was built in the forks of a large birch tree. It contained two fresh eggs, and was taken about the last of April. Another nest was found about 25 miles from this city; both parents were shot, and the two young birds it contained were brought here to be stuffed. The male only was in the mature plumage. The young were about as large as Brahma chicks six weeks old, and covered with a thick coat of pure white down without a sign of pin feathers. This nest was also placed in the forks of a birch tree. It was found May 5."

According to Mr. W. L. Bishop's observations in Nova Scotia, this Hawk breeds on high ground, mostly in hard wood timber, and nearly all the nests found by him were placed in tall slim beech or birch trees, about 40 feet from the ground, built of sticks, and lined with a few green hemlock twigs, yellow birch bark, and a few feathers.

Mr. L. M. Turner says that this Hawk is rather rare in Labrador, but as he observed it near Fort Chimo in May, it certainly breeds there. On May 1, 1876, he took a handsome set of five eggs in the Yukon River Delta, Alaska, and another incomplete set of two eggs on the same date a year later. These eggs were fresh when taken and are now in the U. S. National Museum collection. The nests were placed in poplar trees. Another set of four was taken by Capt. W. H. Dall, of the U. S. Coast Survey, on April 28, 1868, near Nulato, Alaska.

I cannot add any personal observations concerning the life history of this species. It nests early, even in the northern regions; beginning to lay about April 1, or even earlier, in the more southern portions of its range, and in Alaska from about April 20 to May 10. Incubation, as with most of the larger Raptores, lasts about four weeks. But a single brood is raised in a season.

The number of eggs laid by the Goshawk varies from two to five. In the North, where an abundance of food can be readily procured for the young, the larger sets of four or five eggs seem to predominate. They are pale bluish white in color and unspotted. An occasional specimen shows slight traces of brownish-buff markings, which are probably old blood stains. The shells of these eggs are somewhat rough to the touch, deeply pitted, and granulated. They vary in shape from ovate to elliptical ovate. The average

measurement of seventeen specimens in the U. S. National Museum collection is 59 by 45.5 millimetres, the largest egg measuring 61 by 47.5, the smallest 54 by 45 millimetres.

The type specimen (No. 20684, Pl. 6, Fig. 1), selected from a set of five, was taken by Mr. L. M. Turner, U. S. Signal Service, May 1, 1876, in the Yukon River Delta, Alaska.

## 68. Accipiter atricapillus striatulus Ridgway.

WESTERN GOSHAWK.

*Astur atricapillus* var. *striatulus* Ridgway, in History of North American Birds, III, 1874, 240.

*Accipiter atricapillus striatulus* Ridgway, Proceedings U. S. National Museum, VIII, 1885, 355.

(B —, C —, R 433*a*, C 497, U 334*a*.)

Geographical range: Western North America; north to Sitka, Alaska; south to California; east to Idaho.

The breeding range of the Western Goshawk extends from Sitka, Alaska, south through the mountains of the coast region in British Columbia and the States of Washington and Oregon, to about latitude 38° in California. Mr. Ridgway's statement, in his Manual of North American Birds, "breeding at least south to latitude 30°," is evidently a typographical error, and should read "39°."

According to my observations, the general habits of the Western Goshawk are very similar to those of its eastern relative; it is equally destructive to small game of all kinds, particularly the Sooty, Ruffed, and Sharp-tailed Grouse, as well as to the fowls of the poultry yard. While nowhere abundant, it seems to be pretty generally distributed throughout the Blue Mountain region of Oregon and Washington, and breeds in suitable localities where food is plenty. During spring and summer it is seldom seen in the more open districts, though it is abundant enough later on, when the heavy snows drive the game into the foothills and lower valleys. I have shot quite a number of these birds at various times, and all, as far as I am aware, are referable to this subspecies, with one exception, which is intermediate between it and the preceding.

My first acquaintance with the Goshawk dates back to 1870, and on April 21, 1871, while hunting in Lawyer's Cañon, 30 miles south of Fort Lapwai, Idaho, I found a nest of this subspecies containing a single egg. It was placed in the forks of a large cottonwood tree about 50 feet from the ground, and was a bulky affair, fully 2 feet in diameter and quite as deep. The nest was composed of sticks, some of them quite large and loosely put together. It was rather shallow on top and lined with weed stalks, a species of wild nettle, and a few pine needles. The parent on the

nest was quite fierce, and although she did not actually strike the man who climbed to it, she came several times very close to him, uttering shrill screams of anger and protest. While stationed at Camp Harney, Oregon, with the assistance of woodchoppers and Indians, several of their nests were found, none nearer than 2 miles from each other. One, found on May 26, 1875, contained two young just hatched and an egg already chipped. It was in a cluster of pines a few miles northeast of the post. Both parents were exceedingly aggressive, and several shots fired close to them did not seem to intimidate them in the least. I could have easily killed both, but refrained on account of the young. Only one of the birds was in the adult plumage.

A nest found on April 18, 1876, was placed in the top of a tall and bushy juniper tree, only about 20 feet from the ground. It was not as large as the two former, and looked as if it had been newly built. It was situated in a fork of the main trunk and was well hidden. The female was on the nest and commenced screaming before we came within 20 feet of the tree, which caused the discovery. She defended her eggs valiantly, and did not cease her attacks on the climber till he finally succeeded in hitting her with a club, which caused her to leave. The male was not seen. The nest contained three slightly incubated eggs, and was sparingly lined with the dry inner bark of the juniper trees growing in the vicinity. On April 9, 1877, I found another nest not far from where the first was taken in 1875. This was built in a tall pine, at least 50 feet from the ground, and in addition to the usual juniper bark lining it contained a few green fir tops. This also contained three eggs, and incubation had already commenced. I shot the female, a handsome bird in the adult plumage, while it was circling about the climber and trying to strike him. The largest set obtained was one of five eggs. The nest was placed in a bushy pine in a cañon of the Blue Mountains, close to the road from the Umatilla Indian Agency to Grande Ronde Valley, Oregon. This nest, evidently used for years, was well out on one of the larger limbs and placed in a fork of it. It was quite large, and slightly lined with grass, tree moss, "usnea," and a few scales of pine bark; distance from the ground about 50 feet. Both parents were present, and the female was shot, as she was too aggressive for the comfort of the climber. The male was also rather demonstrative, but not to the extent of his mate. The eggs were nearly hatched when found, April 17, 1881. All the cavities of the nests were very shallow, none being over $1\frac{1}{2}$ inches deep. While none of the nesting sites were in the denser portions of the forests, they were all found in the heavy timber, and generally on the slopes of cañons not far from water.

A pair of these birds bred within a mile or so of Fort Klamath, Oregon, in the spring of 1883, but I never succeeded in locating the nest on account of the dense timber found all around the post and the large size of most of the trees. Both birds, but especially the male, a handsome specimen in the

adult plumage, paid regular daily visits to the different poultry yards of the garrison, and almost invariably managed to get away with a chicken. I, as well as others, tried time and again to put an end to these altogether too frequent depredations, but no one succeeded in killing either of the birds. They were too smart to be caught, knew just when to make their raids, and were successful nearly every time.

The following incident will illustrate the perfect fearlessness and audacity of these Hawks. I was returning from a short hunt one afternoon in September, 1882, my breech-loader charged with dust shot. At the outskirts of the garrison, near the cavalry stable, was an old brush corral, much frequented by the fowls kept in the neighborhood. While walking past this fence I suddenly heard a great outcry and saw quite a commotion among a number of chickens in the place, which were squeaking and scattering in all directions at a lively rate. At the same instant a large Goshawk, an adult female, dashed through the inclosure, failing to get a chicken this time, however. I fired at her at short range, and, as it subsequently proved, peppered her well with dust shot as she went by, which possibly disconcerted her aim a little. Never dreaming for an instant that the bird would return after such a reception, I nevertheless inserted a heavier cartridge in my gun, and had scarcely done so when she came back to make a second and last attempt at a too venturesome chicken. This time I brought her down with a broken wing, and her flight was so suddenly arrested that she rolled over several times after striking on the ground. I never saw more vindictive fury expressed in a bird's eyes than was shown by hers. She tried to attack me, and would have done so had she not been so badly wounded. The will and courage to do so were there, but her strength failed her. On skinning her I found a number of dust shot imbedded under the skin, showing that she had been hit the first time I fired. This, though, was not sufficient to cause her to leave without her intended victim, notwithstanding the fact that she saw me plainly enough the second, if not the first time. When its appetite for blood is once excited, the Goshawk is certainly devoid of all fear and discretion as well, while under ordinary circumstances there is no shyer bird to circumvent and bring to bag.

Mr. L. Belding met with this bird in Calaveras County, California, where it seems to be a summer resident.

The Western Goshawk becomes strongly attached to the locality once chosen for a breeding ground. I noticed, especially at Camp Harney, Oregon, that considerable discrimination was shown by these birds in the selection of such places only in which the game they fed on was most abundant.

Besides a shrill scream of anger they have a call note resembling the word "keeah, keeah," or "kree-ah," frequently repeated, this note being often uttered in the early spring. Their food consists of the different game birds found in the country they inhabit, especially the Sooty Grouse, as well as hares and smaller mammals. One of the nests found by me contained the partly-eaten remains of a Columbian Sharp-tailed Grouse.

Nidification begins early, usually about the latter part of March or the beginning of April, long before the snow has disappeared from the mountains and while the hillsides are still saturated with moisture, making it anything but easy work to look for their nests. These are usually built in tall trees, and no particular preference seems to be shown in their selection. The nests are mostly placed close to the trunk and generally well hidden from view. Occasionally one is placed some distance out, or between the forks of one of the larger limbs, and on that account can be more readily seen. I believe each pair of birds has its regular hunting range, from which all other species of Raptores are driven off. At any rate I never found the Western Red-tailed or Swainson's Hawks, the most common kinds found, breeding in the vicinity of a pair of Goshawks.

The eggs are from three to five in number and indistinguishable from those of the eastern bird. I believe but one brood is raised in a season, and do not know whether the male assists in incubation.

The eggs in the U. S. National Museum collection, nine in number, average a trifle larger than those of the preceding subspecies, the mean being 60 by 45.5 millimetres. The largest specimen measures 65.5 by 49.5, the smallest 55 by 44 millimetres. One of these eggs shows some peculiar discolorations of the shell, which are not stains, neither are they spots; and another has very minute and scarcely perceptible markings of pale, rusty brown near the smaller end.

The type specimen (No. 20696, Pl. 6, Fig. 2), selected from a set of five, from the Bendire collection, was taken by the writer near the Umatilla Indian Agency, Oregon, April 17, 1881.

## 69. Parabuteo unicinctus harrisi (Audubon).

HARRIS'S HAWK.

*Falco harrisi*, Audubon, Birds of America, v, 1839, 30, Pl. 392.
*Parabuteo unicinctus* var. *harrisi* Ridgway, in History of North American Birds, III, January, 1874, 254.

(B 46, C 348, R 434, C 512, U 335.)

Geographical range: Middle America; north to southern border of United States (Louisiana to southern Arizona), Lower California.

The breeding range of Harris's Hawk within the borders of the United States is rather restricted, it being found only along our southern frontier from southern and southwestern Texas to southern Arizona and Lower California. It is said to occur also occasionally in Louisiana, but it is doubtful if it breeds there. It extends through Mexico to Central America.

Within the United States it is most abundant in southern and southwestern Texas, where it is a resident and where it breeds commonly.

According to Mr. G. B. Sennett, "it is a resident on the Lower Rio Grande, and more abundant than any other of the family. I found in the

crops of those I obtained mice, lizards, birds, and often the Mexican striped gopher (*Spermophilus mexicanus*), proving them to be active hunters, instead of the sluggish birds they appeared the year before at Brownsville. They are silent and not very shy. Young from the egg are covered with down, more plentifully on crown and back than elsewhere; are colored white on under parts, shading to buff and ochraceous on back and head, and are very pretty little chicks. Dissection of a female on April 11 disclosed an egg almost ready to be laid. On April 22, two sets of eggs were taken, 4 or 5 miles from Lomita, one 25 feet high in an ebony tree, the other 20 feet high in a mesquite. Each contained three eggs hard sat upon."[1]

Capt. B. F. Goss found this species very abundant in the vicinity of Corpus Christi, Texas, in the spring of 1883, and took quite a number of their nests and eggs. He found one containing eggs as early as February 18. He says: "They build a substantial nest of sticks and weeds, lined with grasses and small roots, after the fashion of the Buteos, but do not finish it as nicely as the latter. I examined eighteen of their nests, and there was nothing remarkable about them, except that they were often placed quite low, when higher sites were equally available. The average number of eggs found by me to a set was three, but sets of four are not uncommon."

Personally I met with the nest of this bird on but three occasions during the spring of 1872, while stationed near Tucson, Arizona. One of these nests, containing two fresh eggs, was found on May 17. It was a bulky structure, placed in a low bushy cottonwood tree, in a fork about 20 feet up, about 10 miles below Tucson, near the Laguna, the sink of the Santa Cruz River. It was composed of sticks, and sparingly lined with pieces of the dry inner bark of the cottonwood, and grasses. The bird made no hostile demonstrations, but sailed slowly around above the nest out of gunshot range. The inner cavity of the nest was slight.

The two other nests, each containing but two eggs, were found in low mesquite trees, about 15 feet above the ground, on June 4 and June 6, respectively. The first nest was a very slight affair, composed of mesquite sticks, as well as the dry seed pods of this trees, and a little grass. While standing directly under the nest I could see the eggs through the bottom of it. The third one was similarly situated, and both were found on the barren plains west of the camp.

I know but little about the habits of this species, and while in other regions they seem to associate with the Turkey Vultures and the Caracaras, I never saw them doing so in southern Arizona, where both were also found by me. They appeared to be a lazy sluggish bird, their flight slow, and not graceful.

Dr. James C. Merrill, U. S. Army, found a nest of this species near Brownsville, Texas, placed on the top of a Spanish bayonet some 8 or 9 feet above the ground.

[1] Further Notes on the Ornithology of the Lower Rio Grande of Texas, U. S. Geological and Geographical Survey, Hayden, Vol. v, No. 3, 1879, pp. 419, 420.

Mr. L. Belding reports Harris's Hawk as common at the Cape region of Lower California, where he frequently met with it in May, along the route from San José del Cabo to Miraflores. He also found it within 40 miles of San Diego, California. Mr. Walter E. Bryant saw one at San Jorge, and again near San Juan, where a pair had built in a giant cactus, *Cereus*. On April 6, 1889, he found a nest at San Gregorio, built on the top of a bush, *Atamisquea emarginata*. The nest was rather flat, composed of sticks and lined with grass and orchilla. It measured about 2 feet in diameter. It contained two eggs, which were secured, one quite fresh, the other with a small embryo. One of the eggs is white, the other pale greenish white.[1]

The number of eggs varies from two to four, usually three, and these are mostly oval in shape, a few are ovate, and an exceptional one is short ovate. The shell is lusterless and fairly smooth. The ground color is a dead dirty white; perfectly fresh specimens show a slight greenish tint occasionally. The eggs are usually more or less nest-stained, and some of these stains might readily be mistaken for markings.

A careful examination of twenty-eight specimens in the U. S. National Museum collection shows that about one-half of these egg are unmarked, the remainder are spotted with small irregular blotches of pale cinnamon in some cases and fawn color in others, while some, again, are lavender colored. Only one shade of markings is found on each egg, and none are heavily marked. One of the specimens figured shows the most pronounced markings in the series; in the others they are less distinct, and in some so faint as to be barely noticeable. The eggs are deposited at intervals of several days, but incubation commences as soon as the first egg is laid, and lasts about four weeks. In southern Texas sets of four eggs are by no means rare, while in Arizona and Lower California two seem to be the rule.

The average measurement of the specimens in the U. S. National Museum collection is 54 by 42 millimetres. The largest egg of the series measures 57.5 by 44.5, the smallest 49 by 38.5 millimetres.

The type specimen, No. 20757 (Pl. 6, Fig. 3), from the Merrill collection, is the most distinctly marked egg in the series, and was collected by Asst. Surg. James C. Merrill, U. S. Army, near Fort Brown, Texas. No. 22572, selected from a set of four, an unmarked specimen (Pl. 6, Fig. 4), was taken near Corpus Christi, Texas, on March 30, 1883, and obtained in exchange from Capt. B. F. Goss, of Pewaukee, Wisconsin.

[1] Proceedings Academy Sciences of California, 2d series, Vol. II, 1889, p. 279.

## 70. Buteo buteo (Linnæus).

EUROPEAN BUZZARD.

*Falco buteo* Linnæus, Systema Naturæ, ed. 10, I, 1758, 90.
*Buteo buteo* Lichtenstein, Nomenclator Museo Berolinensis, 1854, 3.
(B —, C —, R 435, C —, U 336.)

Geographical range: Northern portions of eastern hemisphere; accidental in the United States, Michigan (?)

The common European Buzzard is admitted to a place in the North American avifauna on a somewhat questionable record. It certainly does not breed with us. It is a common species throughout the greater part of the continent of Europe, a resident in the southern portion of its range, and only a summer visitor in the northern parts.

Mr. Henry Seebohm, in his excellent work on "British Birds," describes the breeding habits of the Buzzard as follows: "The Buzzard breeds on the outskirts of the forests, whence it issues in search of food, and may often be seen perched on the bare hillsides, waiting for mice and other small mammals, or may be observed crossing the open fields with somewhat heavy and indolent flight. It is equally common in dry as in swampy woods, and breeds in pine forests as freely as in those of beech and oak. In the forests near Brunswick, I found the nests mostly in beech and oak, but in Pomerania many were in Scotch firs, one in a birch, and one in an elm. * * * The Buzzard builds a nest from 1½ to 2 feet in diameter, and if it is in a fork of a tree, sometimes nearly as high. The foundation is of large twigs, finished at the top with slender twigs. It is very flat, the hollow in the middle, containing the eggs, about the size and depth of a soup plate. The final lining is fresh green leaves, generally beech; but in one nest, although it was in a beech tree, the lining was green larch twigs. This lining must be renewed from time to time. Out of eleven nests near Brunswick, five of which contained eggs, five young birds, and one three eggs and a young bird, all but one were lined with fresh leaves. * * *

"The nests varied from 50 to 90 feet from the ground, but some, to which we did not attempt to climb, were higher. In Pomerania I saw several nests in Scotch firs, not more than 25 feet from the ground. My friend Dr. Holland, who has paid great attention to the birds of prey in Pomerania for many years, informs me that the Buzzard begins to lay about the middle of April, that the period of incubation lasts three weeks, and that the male relieves the female at her duties. He tells me that, besides small mammals, the Buzzard will eat grasshoppers and other insects, reptiles, and occasionally small birds, if it gets a chance of catching them sitting. The spines of the hedgehog have been found in the stomach of the Buzzard, and Dr. Holland also mentioned an instance of a female bird having been found dead on the nest, with a live viper under her.

"The Buzzard returns year after year to the same nest, but is said not to breed a second time the same year if the eggs are taken. When the eggs are very much incubated she sits very close."[1]

The eggs are usually from two to four in number, generally three, and according to Seebohm the ground color varies from milky blue to a pale reddish white. They are blotched, streaked, spotted, or clouded with rich brown surface spots and pale lilac shell markings. There is considerable variation in both size and color, some specimens being spotless. They also vary considerably in shape; some are said to be almost round, others oval, some elongated, and, more rarely, elliptical. Their size is given as varying from 57.2 to 50.8 millimetres in length by 48.3 to 41.9 millimetres in breadth.

The U. S. National Museum collection contains a series of eighteen eggs whose average measurement is 55.5 by 44.5 millimetres. The largest of these measures 58.5 by 47, the smallest 52 by 44 millimetres. None of these eggs are figured, as this species does not breed on the North American continent.

## 71. Buteo borealis (Gmelin).

RED-TAILED HAWK.

*Falco borealis* Gmelin, Systema Naturæ, I, ii, 1788, 266.
*Buteo borealis* Vieillot, Nouveau Dictionaire, IV, 1816, 478.
(B 23, C 351, R 436, C 516, U 337.)

Geographical range: Eastern North America, west to border of Great Plains; occasional in eastern Mexico; Panama (casual?).

The Red-tailed Hawk is generally distributed, and breeds more or less abundantly in suitable localities in all that portion of the United States east of the Mississippi River. West of this stream it occurs sparingly in northern Louisiana, and more frequently in Arkansas, the eastern portion of Texas, and in the Indian Territory, Kansas, Nebraska, North and South Dakota. It is fairly common throughout the area indicated, excepting Florida and the Gulf coast generally, where, although very common in winter, it can, from our present knowledge at least, be considered only as a rare summer resident.

North of our border it is found throughout the southern parts of the Dominion of Canada, ranging from Newfoundland, Nova Scotia, and New Brunswick, where along the coast it is generally rare, but common enough, probably, in the interior, through the provinces of Quebec and Ontario, west to Manitoba and the Northwest Territory. Mr. W. L. Bishop found a single nest of this species placed in a large birch tree near Kentville, Nova Scotia, on June 8, 1890, containing two young in the down. He considers it rare in this province.

[1] History of British Birds, 1883, Vol. I, pp. 117–122.

On the Atlantic seaboard it has not, according to Chamberlain, been taken north of latitude 49°, but during the cruise of the U. S. Fish Commission schooner *Grampus*, in the months of July and August, 1887, Mr. William Palmer, the taxidermist of the U. S. National Museum, saw two of these birds on one of the Mingan Islands in the Strait of Belle Isle, off the southern coast of Labrador, which point marks, as far as known, the northern limit of its range in this direction. In the interior it reaches a much higher latitude, having been observed at Fort Churchhill, Hudson Bay, by Dr. Bell, near latitude 59° north.[1]

The Red-tailed Hawk is one of the commonest and best known of the larger Raptores, and occurs more or less abundantly throughout the eastern portion of the United States. It is partial to moderately timbered districts, swampy woods and the bottom lands along water courses being its favorite abiding places; but it is also found, though less frequently, in the more extensive tracts of woods on uplands and in the mountain regions. In the extreme northern parts of its range it is a summer resident only, but nevertheless it is a hardy bird, and can readily endure great degrees of cold. It usually passes south, at times in considerable flocks, during the latter part of September and the month of October, while quite a number linger along our northern borders until November, and not a few winter regularly north of latitude 42°.

It is one of the less active of our Raptores, generally slow and deliberate in its movements, and though larger and far stronger in proportion to its size, it lacks the dash and courage of Cooper's Hawk, and willingly contents itself with more humble prey. It may frequently be seen sitting, for hours at a time, on a dead limb of a tall tree growing at or near the outskirts of a piece of woods, preferably near water, watching for its quarry. One might think them asleep at such times, but they are wide enough awake, as the would-be collector would soon find out should he try to get within gunshot of one. Each bird seems to have its favorite perch, and this is resorted to pretty constantly from day to day. They are very shy and wary, from being more or less shot at and molested, and will not often allow themselves to be approached closely.

Unfortunately the Red-tailed Hawk has a far worse reputation with the average farmer than it really deserves; granting that it does capture a chicken or one of the smaller game birds now and then, and this seems to be the case only in winter when such food as they usually subsist on is scarce, it can be readily proved that it is far more beneficial than otherwise, and really deserves protection instead of having a bounty placed on its head, as has been the case in several States.

This statement is fully borne out by the careful examination of more than three hundred stomachs of this species, made by and under the direction of Dr. C. Hart Merriam, chief of the Division of Economic Ornithology and Mammalogy, U. S. Department of Agriculture. His report shows that the

[1] Canadian Birds, Chamberlain, p. 56.

Red-tailed Hawk, instead of living largely on poultry and game birds, as is generally believed, feeds mostly on mice and shrews, as well as on frogs, toads, crawfish, snakes, lizards, and insects of various kinds. Comparatively few of their stomachs, less than one in ten, contained the remains of poultry or game birds, while fully two-thirds contained mice. In the Mississippi and Ohio Valleys, where squirrels abound, they feed very largely on these, and in the more open prairie regions in Iowa, Illinois, and Wisconsin they live on ground squirrels, gophers, and meadow mice; rabbits also are often caught by them, and small birds but rarely. Pairs of these Hawks frequently hunt together, and in such case it is difficult for even so nimble an animal as a squirrel to escape them.

In the Middle and Northern States such birds as have migrated, generally return from their winter haunts by the middle of February or the beginning of March, and somewhat later farther northward. During the mating season they are rather noisy, like most Raptores. Their principal call note at these times—generally uttered during their aërial gyrations, while circling about, high in air, chasing and pursuing each other in the vicinity of their future home—is a shrill and far-reaching "kee-aah," repeated at short intervals. Another note, somewhat like "chirr" or "pii-chiir," is also uttered during this season, when perched on some dead limb near their nest. At other seasons they are much more silent.

There is considerable difference in their nesting habits in some sections, so that while in certain localities most of them nest on high ground, in other places the majority prefer the heavily timbered bottom lands.

Dr. William L. Ralph has kindly furnished me the following notes on this species, based principally on observations made by him in Oneida and Herkimer Counties, New York. He says: "The Red-tailed Hawks are migrants in this locality, although a few may remain during mild winters. They begin to arrive from the south from the first to the middle of March, and at once commence repairing their old nests or building new ones, and by the 1st of April the first eggs are laid. I think that, with the exception of the Bald Eagle, *Haliætus leucocephalus*, this bird nests earlier in this locality than any other member of the family *Falconidæ*. The places chosen by them for nesting are rather small woods, and when they nest in large forests, which is seldom, they will be found on the extreme borders. Once in a great while they nest in isolated trees growing in the vicinity of woods. One pair that I have watched with great interest has nested for several years in a large elm tree that is standing in a meadow about 20 rods from a wood where they formerly nested, and from which they were driven by a pair of Great Horned Owls, *Bubo virginianus*, taking possession of their nest. I have known other instances of the Great Horned Owl appropriating the nest of the Red-tailed Hawk. In one case the Hawks had built a nest which they were occupying at the time I found it, and they used it for two or three years after. It was then taken possession of by the Owls, which held it for two

years and then for some cause left it, and after remaining unused for a year it was again taken by the Hawks which had, in the mean time, nested in the same wood only about 20 rods away.

"Both this and the Red-shouldered Hawk will sometimes, when driven from a nest, build a new one, which they may occupy for a year or two and then return to the old one. In this vicinity the Red-tailed Hawk prefers birch trees above all others to build in, and about 80 per cent. of their nests will be found in such situations. The remaining 20 per cent. is about equally divided among beech, maple, hemlock, elm, and basswood trees. Why these birds should prefer birch trees I do not know, for they are usually not very hard to climb, while the most difficult of their nests to reach were built in elm, hemlock, and basswood trees. They generally select the largest and tallest trees they can find to build in, and their nests are situated near the tops, in crotches formed by two or more large limbs, or at the junction of large limbs with the trunks. They are usually placed from 60 to 70 feet from the ground.

"The nests are composed of sticks lined with strips of bark and twigs from coniferous trees, usually the hemlock, and feathers from the birds themselves, which become more and more numerous as incubation advances. They are large structures, but not out of proportion to the size of the birds. If not molested they will occupy the same nest for a number of years.

"About one-half of the nests of the Red-tailed Hawk found in this region contained four eggs or young, and nearly all the remainder two. At least I have never seen a nest with more than four, or less than two young birds, or partly incubated eggs, and but one or two that contained three.

"Their eggs vary considerably in size, more so than those of any other bird of prey with which I am acquainted, and the size of these seem to have no connection with the size of the sets, as the largest sets will often contain the largest eggs, and again both large and small ones are often found in the same nest. But one brood is raised in a season; but like most other birds of prey the female will lay several sets of eggs when the first have been destroyed. Both sexes assist in incubation, and usually are not very solicitous about their eggs and young, and after they once leave their nests they seldom come within gunshot, or make much ado.

"The places where Red-tailed Hawks like best to live are small woods with open swamps, or with meadows and pastures near by, and indeed all grounds that are frequented by mice, for these little mammals are their favorite food, as is the case with nearly all other Hawks and Owls.

"Their call note is weak for the size of the bird, and has a rather disagreeable sound, resembling the squealing of a pig more than anything else. I found the Red-tailed Hawk rather rare in Putnam and St. Johns Counties, Florida, even in winter, and very few remain there to breed. On March 18, 1891, one of my assistants found a nest of this species in a wild and desolate place, about 20 miles southeast of San Mateo and 4 or 5 miles from the nearest

house. I did not examine this nest till March 26, when it contained a young bird just hatched and an egg from which the young was on the point of emerging. The parents made much ado and frequently flew at my climber, coming sometimes within 10 feet of him. The nest was placed in a good-sized pine tree in low pine woods and about 30 yards from a cypress swamp. It was situated 56 feet from the ground, and about 2 feet from the body of the tree, on a large limb. It was composed of sticks with pine needles scattered among them, and lined with cypress bark, pine needles, Spanish moss, rabbit hair, and feathers from the sitting birds. It also contained a dead mouse and the remains of a large rabbit. The nest, though of large circumference, was very shallow and had hardly any depression for the eggs to lie in; from the fact that another large nest laid on the ground below this one, which appeared to have been blown from the same tree, I think the female was obliged to lay in the new one before it was completed. The egg was badly nest-stained, fairly well marked, and measured 62 by 45 millimetres."

According to Mr. P. Smith, jr., the Red-tailed Hawk is very common during the breeding season in portions of southwestern Illinois, and especially so in Bond County, where they nest in considerable numbers. Here they prefer high dry woods to the swampy bottom lands for the purpose of nidification. No special preference is shown for particular species of trees; oaks, hickory, or elms are most often used to nest in. They place their nests at various distances from the ground, anywhere from 20 to 90 feet up, generally from 50 to 60 feet. Usually they nested in or near the edges of timbered tracts, and an occasional nest might be placed in an isolated tree in a pasture. A pair of these Hawks were always sure to be found in any grove inhabited by squirrels, whose worst enemies they are. They also catch many rabbits.

In southwestern Illinois nidification ordinarily commences about March 20; full sets of eggs, however, have been found as early as March 3, and again as late as June 10, the latter no doubt being second or even third layings. The number of eggs to a set is two or three, some seasons the smaller sized sets predominating, in others the larger. In more than a hundred nests examined by Mr. Smith, but one contained four eggs.

The nest of the Red-tailed Hawk is a large bulky structure, measuring on an average about 24 inches in diameter and from 10 to 15 inches in depth. The inner cavity is rather shallow, usually not over 2 inches deep. There is considerable variation both as regards size and bulk in their nests, those which have been used for several years in succession, and to which slight additions are made yearly, exceeding such as are newly built. Generally they are very indifferently lined and not models of neatness. Sometimes the eggs lie directly on the coarse twigs of which the nest is composed; other nests are fairly well lined with strips of bark, corn husks, dry leaves and grasses, weed stalks, moss, or fine hemlock twigs.

In the southern part of its range the Red-tailed Hawk commences nesting in the latter half of February or the first week in March, and even at more

northern points nidification sometimes begins equally early. Mr. J. W. Preston informs me that he took a set of eggs of this species on March 5, 1890, near Baxter in central Iowa, which were, even at that early date, slightly incubated. Heavy snow fell while the eggs were being deposited, and this pair of birds were seen repairing the old nest some time in the latter part of January. He found a pair of these birds nesting in a most unusual situation, their domicile being placed in a cottonwood tree, not over 12 feet from the ground and close to a public road. In the western parts of its range it nests frequently in large cottonwood and sycamore trees.

In the New England and Northern States, the Red-tailed Hawk nests usually in April, apparently as often during the first as the last half of this month, and correspondingly later northward.

Usually but a single brood is raised in a season, but in the hill country of South Carolina, the Piedmont region, where this species is not uncommon, Dr. Leverett M. Loomis, well known as an exceedingly accurate observer, informs me that two broods are not infrequent.

If the first set of eggs is lost, a second and sometimes a third is laid, and on very rare occasions even a fourth. A pair of birds will sometimes build two nests, and if one of these is robbed the second is made use of. The eggs vary from two to four in number. Sets of two are most often found throughout the greater part of its range, while three are not rare, and in northern New York sets of four appear to be as common as smaller ones. Incubation lasts about four weeks, the male assisting to some extent in this duty, as well as providing his mate with food while on the nest. The eggs are deposited at intervals of about two days.

Generally the Red-tailed Hawk shows but little courage or devotion in defense of its eggs or young, contenting itself with uttering its protest by shrill screams from a safe distance, but as in everything else, there are frequent exceptions to this rule, and many pairs show much devotion in the defense of their homes, darting down close to the intruder, and screaming fiercely at him.

The ground color of these eggs is usually a dull or pale creamy white. Occasionally a faint bluish white tint is perceptible, which fades more or less with age.

In the series before me about one-fifth of the eggs are unspotted, and a heavily marked one may be found in the same set with an unspotted egg. About four-fifths of the eggs are more or less marked with irregularly shaped spots and blotches of different shades of reddish and yellowish browns, which vary considerably in size, shape, and intensity. A few specimens have longitudinal markings, like No. 23150, *Buteo swainsoni* (Pl. 8, Fig. 6), and some show shell markings of lavender and écru-drab. These markings are often of rather uniform size, sometimes large and bold, in others small and pretty evenly distributed over the entire surface of the egg, and again they are confined principally to either end. The majority are moderately well marked

and only occasionally is a heavily blotched set found. In shape, some are nearly oval, one end however, is generally a trifle smaller. Many are ovate or short ovate.

The shell in most specimens is coarse and strongly granulated, but now and then an egg is found that is much closer grained and feels rather smooth to the touch. The average measurement of a series of eighty-three eggs is 60 by 47.5 millimetres. The largest egg in this series measures 65.5 by 50, the smallest 55.5 by 45 millimetres.

Inasmuch as there is no perceptible difference in the eggs of the Red-tailed Hawk and its geographical subspecies, the type specimens have been selected from the whole series to show as nearly as possible the variations in markings irrespective of race. Those figured (of *Buteo borealis* proper) show the unmarked type and a fairly well-spotted egg.

Of these, No. 12740 (Pl. 6, Fig. 5), a plain colored egg, was collected in Richland County, Illinois, by Mr. Robert Ridgway, of the Smithsonian Institution, on March 6, 1887, and No. 23610 (Pl. 6, Fig. 6), a distinctly and fairly well-marked egg, was taken by Mr. J. W. Preston, near Baxter, Iowa, April 7, 1888. They are from sets of two eggs.

## 72. Buteo borealis kriderii Hoopes.

KRIDER'S HAWK.

*Buteo borealis* var. *kriderii* Hoopes, Proceedings Academy Natural Sciences, Phila., 1873, 238, Pl. 5.

(B —, C 351*c*, R 436*a*, C 519, U 337*a*.)

Geographical range: Great Plains of the United States, from Minnesota to Texas; east, irregularly or casually to Iowa and northern Illinois.

Very little is yet known regarding the exact limits of the breeding range of Krider's Hawk, a light-colored race of the Eastern Red-tail. It seems to be restricted to the plains proper, and up to the present time has been found more frequently in western Minnesota during the breeding season than anywhere else, though nowhere abundant. Col. N. S. Goss states that it breeds occasionally in western Kansas. Mr. George G. Cantwell gives it as a summer resident, in his recently published list of the "Birds of Minnesota," and he writes me that he found a nest of this Hawk on May 18, 1889, containing three eggs. It was placed in an elm tree about 50 feet from the ground, situated in a grove which fringed the Lac-qui-parle River, near Dawson, Minnesota. The structure of the nest, as well as the eggs, he says, were similar to those of the common Red-tail.

Messrs. Thomas S. Roberts and Franklin Benner, in speaking of Krider's Hawk, say: "On the 17th of June we took from one of the large cottonwood trees on the border of the Minnesota River, in Brown's Valley, a young Hawk, not more than a week old, which we brought back to Minneapolis with us.

The parent bird soared above the nest while the young bird was being taken, and her noticeably white appearance attracted our attention at once, and we judged her to be of this species. The growth of the young bird has gradually confirmed this idea, as it now, at the age of nearly three months, shows unmistakable evidences of being this light variety of Red-tailed Hawk. * * * This bird has become very tame and is a great pet, allowing itself to be handled, and distinguishes persons."[1]

Mr. Robert Ridgway, of the Smithsonian Institution, has also examined two females of this race which were shot from their nests in Minnesota, and as far as I have been able to learn this State is the only one in which Krider's Hawk is as yet positively known to breed. It is likely, however, that it also nests in the prairie regions of Wisconsin, Iowa, and northeastern Illinois. Mr. H. C. Cole, of Chicago, Illinois, writes me that he collected a bird of this race at Half Day, Lake County, Illinois, 34 miles northwest of Chicago, on July 25, 1876, which evidently was a summer resident. Its mate was also seen, but was too wary to be shot. This specimen is now in the U S. National Museum collection.

It has been repeatedly reported as breeding in western Texas and likewise among the cliffs of Colorado, but these records are somewhat questionable and require confirmation. No specimens actually taken during the breeding season in these States have as yet found their way into any of our larger ornithological collections.

There are no positively identified specimens of the eggs of Krider's Hawk in the U. S. National Museum collection, but they are not likely to differ materially from those of the preceding species. Nidification seems to take place a little later than with the common Red-tailed Hawk. The winters are spent in more southern latitudes, in Texas and southward.

## 73. Buteo borealis calurus (Cassin).

WESTERN RED-TAIL.

*Buteo calurus* Cassin, Proceedings Academy Natural Sciences, Phila., VII, 1855, 281.
*Buteo borealis* var. *calurus* Ridgway, Bulletin Essex Institute, V, November, 1873, 186.
(B 20, 24, C 351*a*, R 436*b*, C 517, U 337*b*.)

Geographical range: Western North America, from the Rocky Mountains to the Pacific; south into Mexico; casual east to Illinois.

The breeding range of the Western Red-tail, a darker colored race than the two preceding, extends from northern and northwestern Texas, through the Rocky Mountain regions of Colorado, New Mexico, and Arizona, northward through Wyoming, central and western Montana, Utah, Nevada, and Idaho, and on the Pacific coast from Lower California, through California, Oregon, and Washington well into British Columbia. A single specimen, a

[1] Bulletin Nuttall Ornithological Club, Vol. 5, January, 1880, p. 17.

young bird, was shot by Lieutenant Rockwell, U. S. Navy, in the vicinity of Hot Springs Bay, on Baronof Island, near Sitka, Alaska, latitude 56° 30′, on June 5, 1880; this was probably raised in the neighborhood, and marks the most northern point at which it has yet been found.

The Western Red-tail, though nowhere very abundant, is pretty generally distributed over western North America at large, and is, next to Swainson's Hawk, the commonest of the larger Raptores found in these regions. Its habits are in many respects similar to those of the common Red-tailed Hawk of the Eastern States; it is fond of the tall timber bordering the banks of streams, and is as often found far in the mountain passes and deep cañons as in the more open country in the foothills and the adjacent plains, but seems to shun the dense and extensive forests, and is rarely seen excepting on the borders of these. In some of the desert regions of western Texas, southern New Mexico, and Arizona, it is not infrequently met with at long distances from water, and has even been found breeding in such localities. It is only a summer resident in the more northern parts of its range, wintering along the southern border of the United States, or passing south into Mexico. Col. N. S. Goss has found it not uncommon in winter, in Kansas, and I have met with it during every winter month at Fort Klamath, Oregon, but not as frequently as in the summer.

It is one of the earliest migrants to return to its breeding grounds, arriving about the latter part of February or the first week in March, and is readily noticed then, both on account of its size and its shrill squeals, uttered during the greater part of the day while circling high in the air, in proximity to its future summer home. They appear to be very much attached to certain localities and return to them from year to year. Their call notes are very similar to those of the Eastern Red-tail.

In Washington, Idaho, Oregon, and California it lives principally on the different species of ground squirrels so common and destructive in these States, as well as on chipmunks, mice, snakes, lizards, frogs, rabbits, and now and then a chicken. I have never seen one molesting chickens during a number of years' residence where these birds were not uncommon. Mr. Charles A. Allen, of Nicasio, California, corroborates this. He says: "I have never known them to disturb domestic fowls. They subsist on small animals and catch large numbers of snakes." Dr. E. A. Mearns, assistant surgeon, U. S. Army, found remains of rattlesnakes in the crops of three specimens, indicating that they are a match for even these poisonous reptiles. In the late summer and fall they live to a great extent on grasshoppers, wherever they are abundant, and seem to be very fond of them. Birds shot at such times rarely contain any other food in their stomachs.

Mr. William Lloyd writes me that in western Texas they feed on prairie dogs, rock squirrels, cottontail and jack rabbits, an occasional Scaled Partridge, and in winter sometimes on the carcasses of goats, sheep, and cattle, sitting around like true Vultures waiting for sick animals to die. Mr. W Otto

Emerson informs me that in one of their nests near Haywards, California, containing a young Hawk still in the down, he found two gophers and a steel trap containing a squirrel; and he also saw a pair of these birds fighting or playing over a snake, which would be dropped by one of them and caught by the other before it reached the ground, until finally the prize was carried off.

In his paper on "Birds from the Farallon Islands," Mr. Walter E. Bryant makes the following statement regarding this subspecies: "Every spring the island is visited by numbers of these Hawks. In 1882 they came in April, about the time of the arrival of the Murres, leaving again in May. During their short stay they fed almost exclusively upon the Murres, killing, in the estimation of Mr. Emerson, several dozen a day."[1]

On the whole the Western Red-tail, viewed from an economic standpoint, is far more beneficial than otherwise.

Nidification begins rather early, and where the birds are not persistently disturbed the old nests are resorted to and repaired from year to year. In southern California full sets of eggs of this subspecies have been found as early as February 20; usually, however, they do not lay much before March 10, and the majority not before April. Most of them nest in this month, not only in California but in Arizona, New Mexico, and northwestern Texas also. Even at points considerably farther north, as at Fort Lapwai, Idaho, I have found full sets of eggs by April 10. In the mountains of Oregon, Washington, Idaho, Montana, and Wyoming they usually nest somewhat later, generally in the last week of April or the beginning of May. Mr. F. Stephens has found this subspecies nesting as late as June 12, but in this case the birds had most likely lost their first clutch.

The nests are placed at various distances from the ground, sometimes in quite low situations, and again at a great height, especially when placed near the tops of tall redwood and pine trees, often fully 100 feet from the ground, and practically inaccessible. Mr. W. E. D. Scott mentions finding nests of this species in southern Arizona as low as 10 feet, and one only 7 feet from the ground. Their average height is from 30 to 50 feet. In their choice of nesting sites, large cottonwoods, sycamores, and live oaks are generally selected, while pines, redwood trees, junipers, mesquites, willows, and aspens come in the order named.

In southern Arizona they also nest occasionally in a sahuara, the giant cactus peculiar to that region. On March 24, 1872, I found a nest of this subspecies thus situated, which contained two partly incubated eggs. It was a very large and bulky one, and had evidently been used for a number of years, the sticks in the bottom of the nest being quite rotten. It was placed between the main trunk and one of the arms of the cactus, about 12 feet from the ground, and was found near the source of Rillitto Creek, Arizona. The nest was rather flat on top, and fairly well lined with the inner bark of

[1] Proceedings California Academy Sciences, 2d ser., Vol. 1, 1888, p. 45.

the cottonwood and a few dry leaves. It was fully 30 inches in diameter on top and 20 inches deep outside. In southern Colorado and northwestern Texas they nest occasionally on cliffs and the sides of perpendicular bluffs. Mr. William Lloyd presented a fine set of three eggs of this species to the U. S. National Museum collection, taken from the side of a chalk bluff, about 75 feet from the bottom and 20 feet from the top of the bluff, on April 2, 1890, in Presidio County, Texas. Such sites are probably selected on account of the absence of suitable trees.

I believe they rarely build a new nest in the West, the old ones being generally repaired by the addition of a little fresh material. The fibrous bark of the redwood is often used for lining when obtainable, and the fine inner bark of the cottonwood likewise.

In western Texas the same nest has occasionally done duty for two different species of Raptores, the Western Horned Owls using it in January and February, and the Red-tails subsequently.

But a single brood is raised in a season; a second and sometimes a third set of eggs is laid, however, should the first be taken or destroyed. The usual number of eggs is two or three, sets of one or four being rarely found. I have, however, found the Western Red-tail incubating a single egg in which the embryo was well advanced and where the birds had not been previously disturbed, and also found a set of four, near Fort Lapwai, Idaho, in the spring of 1871.

Mr. Charles H. Townsend took another set of four near Red Bluff, California, in April, 1884. The nest from which these eggs were taken was placed in a scrubby oak, about 20 feet from the ground. It was built of heavy twigs and had a uniform lining of soap root fiber.[1]

Incubation lasts about four weeks, and the eggs are deposited at intervals of a couple of days. There is no marked difference in the size, shape, and color of these eggs as compared with those of the common Red-tailed Hawk, and they are practically indistinguishable from each other; but among those before me the proportion of spotted ones is larger than in the former, very few being entirely unmarked. The average measurement of thirty-six eggs of the Western Red-tail is 59 by 46.5 millimetres. The largest egg of the series measures 66 by 46.5, the smallest 53.5 by 44 millimetres.

The type specimens selected show the more heavily marked styles. No. 20745 (Pl. 6, Fig. 7), from a set of three in the Bendire collection, was taken by the writer near Camp Harney, Oregon, May 29, 1877, and incubation was far advanced when found. It shows a considerable amount of the lavender and écru-drab shell marking, not commonly found among the eggs of the Red-tailed Hawks. No. 20763 (Pl. 6, Fig. 8), from a set of two, Bendire collection, is the darkest colored egg of the entire series. The ground color in this specimen is a rather light fawn, while in the other it is of the normal tint. It was taken by myself from a nest in an oak tree near Camp Crittenden, Arizona, April 29, 1872.

[1] Proceedings U. S. National Museum, 1887, Vol. x, p. 202.

## 74. Buteo borealis lucasanus Ridgway.

SAINT LUCAS RED-TAIL.

*Buteo borealis* var. *lucasanus* Ridgway, in Coues's Key to North American Birds, 1872, 216 (under *B. borealis*).
(B —, C 351*b*, R 436*c*, C 518, U 337*c*.)

Geographical range: Cape St. Lucas, Lower California.

The St. Lucas Red-tail, a scarcely tenable race, very similar to *B. borealis calurus* excepting that the black bars on the tail of the adult are generally wanting, is confined to the Cape St. Lucas region of Lower California. Its habits, nests, and eggs, are like those of the Western Red-tail which occupies the same localities.

Since this was written, Mr. William Brewster has made a careful study of this supposed subspecies, and in a letter to me, dated March 15, 1891, he makes the following remarks: "In my opinion there is no such bird as *Buteo borealis lucasanus*. The type and the mounted specimen in the U. S. National Museum collection are simply lightly banded specimens of the Western Red-tail. Both have the band, but it is indistinct. I can match the mounted bird by specimens from both Lower California and Arizona. I brought together nearly one hundred skins, including over thirty from Lower California; the latter as a series show no peculiarities so far as I can see. The type of *Buteo borealis lucasanus* is certainly peculiar in respect to the tail, but in no other way." I fully agree with Mr. Brewster's conclusions.

## 75. Buteo borealis harlani (Audubon).

HARLAN'S HAWK.

*Falco harlani* Audubon, Birds of America, I, 1830, 441, Pl. 86.
*Buteo borealis harlani* Ridgway, Auk, VII, 1890, 205.
(B 22, C 350, R 438, C 515, U 337*d*.)

Geographical range: Gulf States and Lower Mississippi Valley; north (casually) to Kansas, Iowa, Illinois, and Pennsylvania; east to Georgia and Florida.

Harlan's Hawk, which till recently figured as a distinct species, is now considered only a variety of *Buteo borealis*. It is the darkest of the different geographical races of this species, and ranges from northern Florida, Georgia, the Gulf States, and the Lower Mississippi Valley, north to Kansas, Iowa, Illinois, and Pennsylvania.

All we know about the breeding habits of this subspecies is Audubon's statement, who first described this Hawk from a pair obtained by him near St. Francisville, Louisiana, which had bred in that neighborhood for two seasons; were shy and difficult of approach, and for a long while eluded his pursuit.[1]

[1] History of North American Birds, 1874, Vol. III, p. 294.

My friend, Dr. William L. Ralph writes me: "Harlan's Hawk is not very uncommon, during the winter, in St. Johns and Putnam Counties, Florida, but until this season I had taken it for the Caracara, which is quite rare here, and I now believe that most of the Black Hawks seen by me during past years were referable to this subspecies. They are exactly like the Red-tailed Hawks except in color, and their call note is also the same, only being longer drawn out. The call of the latter bird as already stated, sounds like the squealing of a pig, or 'kee-ee-e,' and that of Harlan's Hawk like 'kee-ee-ee-e-e-ee.'

"They are not uncommon here in wild and unfrequented places, but are seldom seen in the more settled parts. They are well known to the native hunters and cattle men, who call them Goshawks. I have seen six or eight different birds this season, 1891, that I am sure belonged to this subspecies. The last one noticed by me was a few days before these notes were written, on March 26. With the exception of the first pair, observed on February 3, which acted as having taken possession of a large nest in a pine tree, but which, on a subsequent visit, was found occupied by a pair of Florida Barred Owls, I have seen no evidence of their breeding, nor have I found an occupied nest, although a friend and myself, as well as two assistants, have looked for them to the exclusion of other nests for the past month.

"If the grass in the low pine woods or prairies be fired, and these birds are near enough to see the smoke, they will come to it at once, like the Red-tailed and other Hawks already mentioned, and fly just ahead of the blaze to catch the small mammals driven out by the heat. They are very wild indeed, and unless concealed from their view it is almost impossible for a person to get nearer to one than 300 yards. One of my assistants tells me that on March 29 he saw five of these Hawks that came to a big prairie fire that had been started. He said that a pair of these birds were chasing one another as if they were mating, and that one flew into the smoke and caught some small mammal which it gave to its mate. I have examined several nests that I was told were occupied by these birds last year, but have not found anything in them, and believe they have not begun nesting yet."

The nest and eggs of Harlan's Hawk are probably very similar to those of the common Red-tailed Hawk.

## 76. Buteo lineatus (Gmelin).

RED-SHOULDERED HAWK.

*Falco lineatus* Gmelin, Systema Naturæ, I, ii, 1788, 268.
*Buteo lineatus* Jardine, ed. Wilson's American Ornithology, II, 1832, 290.
(B 25, C 352, R 439, C 520, U 339.)

Geographical range: Eastern North America; north to Nova Scotia and southern Canada; west to Texas and the Great Plains; south to the Gulf coast and Mexico.

The breeding range of the Red-shouldered Hawk extends through eastern North America from Maine to Florida, and westward to the borders of the Great Plains. It reaches central Texas, where it appears to be common, and, according to Mr. William Lloyd, it is a rare resident of western Texas; it is also found in the eastern portions of the Indian Territory and in eastern Kansas and Nebraska. It appears to be rare in Minnesota, and probably occurs in small numbers in the more heavily timbered parts of South and North Dakota. Mr. W. E. D Scott, in his "Birds of the Gulf Coast of Florida," reports it as common and breeding there.[1]

While perhaps the majority of the Red-shouldered Hawks found in the central parts of Texas bear a closer resemblance both in size and coloration to *B. lineatus* than to the two geographical races, *B. lineatus alleni* and *B. lineatus elegans*, they are not typical representatives of either. Specimens from Hale County, central Alabama, shot during the breeding season, are typical *B. lineatus*. North of the United States it reaches the southern borders of the Dominion of Canada from northern Nova Scotia, where it is, however, very rare, and westward to eastern Manitoba. Mr. T. McIlwraith reports it as a common summer resident in southern Ontario,[2] and Mr. M. Chamberlain, in his "Catalogue of Canadian Birds," makes the following remarks about this species: "A rather common summer resident of the eastern provinces, probably more abundant in Ontario than elsewhere. Dr. Bell reports its occurrence at York Factory, on Hudson Bay; and Mr. Thompson, on the authority of Mr. Hunter, gives it as rather common in eastern Manitoba."

The habits as well as the ranges of the Red-tailed and Red-shouldered Hawks are very similar; the former being slightly the hardier bird of the two, and reaching somewhat farther north. Like the Red-tailed Hawk, it is only a summer resident in the northern parts of its breeding range, migrating south in winter, some passing into Mexico. It winters commonly in latitude 39°, and some remain throughout the year in favorable localities in the southern New England States.

Dr. William L. Ralph writes me: "The Red-shouldered Hawk is the commonest bird of prey in Oneida and Herkimer Counties, New York. There has

[1] Auk, Vol. VI, 1889, p. 247.
[2] Journal and Proceedings Hamilton Association, Vol. II, 1886, p. 160.

hardly been a year in the past twelve that, with the help of one or two assistants, I have not found from twenty to thirty of their nests while looking for those of other birds. Although they occur sometimes during the winter months, these birds are migratory, and usually arrive in this locality from the South about the middle of March, occasionally a little earlier or later, being influenced by the condition of the weather. Like the Red-tails, they commence working on their nests almost immediately after their arrival, but do not begin laying quite so early. The majority of their eggs are deposited here between the 20th of April and the 1st of May; I have found full sets, however, on the 10th of the former month, and as late as the last day of the latter. Those laid after May 12 were probably second layings. The sets here vary in the following proportion: One-half of the nests contain three eggs, one-third four, and one-sixth only two. The second and third layings never consist of more than three eggs, and generally of but two.

"The Red-shouldered Hawk raises but one brood in a season, but they generally lay two or three sets of eggs should the first be destroyed. Both birds assist in incubation and make a great fuss when their nests are disturbed, and although they seldom approach very near to the persons examining them, they keep up their loud calls as long as any one remains in the vicinity. Like all birds they show more solicitude just before and just after their eggs are hatched, and no matter how wild and suspicious they may have been, or how many times they may have been shot at, they usually appear to lose all sense of danger at such times.

"The young birds when just out of the shell look like balls of yellowish down, and their eyes are as bright and clear as those of the adults. In a remarkably short time they learn what food is for, and will fight among themselves for it, and peck at one another when they are but a few hours old.

"The nest of the Red-shouldered Hawk is composed of sticks, lined with birch bark, strips of the inner bark of various trees, and hemlock twigs. Occasionally evergreen twigs, dry grass, or dead roots are added to to, or substituted for, some of the materials of which the lining is composed; also more and more of the feathers from the lower parts of the sitting birds drop out and are added to the lining as the eggs advance in incubation. There are no birds of prey that I am acquainted with, of whose eggs I cannot tell almost the exact stage of incubation by the quantity of feathers in the lining of its nests, they increase so regularly.

"The nest is either located in a crotch of a tree or against the trunk on limbs growing out from it, at an average height of about 50 feet; 37 and 60 feet from the ground are the lowest and the highest locations of the nests according to measurements made by me. The trees chosen by the Red-shouldered Hawk to nest in are birch, ash, maple, and beech. If there is any preference shown in their selection it is in favor of the birch and ash. The places they like best to breed in are small woods, located in the neigh-

borhood of open fields and swamps, and they frequent such localities most of the time they remain with us.

"I have noticed one habit of this Hawk which is common with most birds of prey that I am familiar with—while they will breed in close proximity to birds of the same order, they will never breed very near one another—each pair occupying a piece of woods by themselves, unless it should be quite a large one, and excluding all others of the same species.

"Among other cases of the kind, I have known the Red-tailed and Red-shouldered Hawks and the Great Horned Owl to nest near one another in a small wood, and on one occasion I found a pair each of the Sharp-shinned, Cooper's, and Red-shouldered Hawks, and of the Long-eared Owl breeding so near together that I could stand beside the nest of a Ruffed Grouse, which was close by also, and throw a stone to any of the others.

"According to my observations the food of this Hawk consists principally of mice, with the addition of moles, squirrels, young rabbits, and once in awhile a small bird. They catch very few of the latter, but destroy perhaps more poultry than the Red-tails, probably because they are more numerous here and not so wild, but I am certain that the few fowls they take are more than compensated for by the good they do in destroying noxious rodents."

According to a careful investigation of one hundred and two stomachs of this species, made under the direction of Dr. C. Hart Merriam, in charge of the Division of Economic Ornithology and Mammalogy, U. S. Department of Agriculture, during the year 1887, the following summary was obtained: Of 102 stomachs examined, 1 contained poultry; 5, other birds; 61, mice; 20, other mammals; 15, reptiles or batrachians; 40, insects; 7, spiders; 8, crawfish; 1, earth-worms; 1, offal; 1, catfish, and 3 were empty. The majority of these birds were taken between the months of October and March. This shows conclusively that the Red-shouldered Hawk is one of the beneficial species, and does little injury.

In the southern part of its range it begins laying early in March; in North Carolina, Tennessee, Missouri, and Kansas about the latter half of this month; in the New England and other Northern States rarely before the second week in April, usually about the middle of this month, and correspondingly later northward. They build more frequently in small woods than the Red-tails, and the majority of their nests are found in lower situations, varying in height from 20 to 65 feet, rarely more, averaging about 40 feet from the ground.

Besides the species of trees already mentioned, they nest in elms, oaks, hickories, pines, and chestnuts. On Long Island, New York, Mr. William Dutcher informs me that the latter are almost invariably selected. Their nests are usually smaller than those of the Red-tail, measuring generally from 18 to 24 inches in outer diameter by from 5 to 8 inches in depth. The bulk of the nest varies considerably, according to its location in the

tree and as regards its component parts. Some nests are almost entirely constructed of pine or hemlock twigs, both green and dry, and lined with leaves of the pine, moss, lichens, bits of bark or corn husks, besides the materials already mentioned. They nest later than the Red-tails and build new nests more frequently than does that species.

They are certainly the most prolific of the Buteos; sets of four eggs are not at all rare, others of five and even six eggs are occasionally found. The late Dr. William Wood, of East Windsor Hill, Connecticut, records having taken a set of six, and Mr. R. B. McLaughlin, of Statesville, North Carolina, writes me that he took a set of six eggs of this Hawk on April 5, 1889. He says: "I saw these birds at work on the nest early in March; it was an old one remodeled, and was placed in the crotch of a good sized pine. I expected to find eggs in it much sooner than I did. Incubation had just commenced. The eggs were of the usual size, without any perceptible variation either in shape or size. There was considerable difference in their markings, however, but no greater than sometimes occurs in sets of three."

The Red-shouldered Hawk is far more common in the lowlands than in the mountain regions, in parts of which it seems to be entirely absent. It prefers the borders of streams, lakes or swampy woods for a permanent residence. Its flight is easy and graceful, and it is seen on the wing mostly in the early and late hours of the day. Like the Red-tail, each of these birds has its favorite perch on a dead limb of some tall tree on the outskirts of a piece of woods, from which it can obtain a good view of the surrounding country; this it occupies for hours at a time when not disturbed.

According to Dr. Ralph "its call notes consist of a loud whistle-like sound, which resembles the syllables 'whee-ee-e,' with once in awhile a 'ca-ac' added to or rather mixed with it." The full-grown young after having left the nest, and when still depending on the parents for food, utter frequently, according to my observations, a call sounding, as near as I can interpret it, like "yeeh-ack, yeeh-hack," rapidly repeated. A note uttered in the early spring, especially during the mating season, sounds like "kéé-yooh, kéé-yooh," the last syllable drawn out.

Incubation sometimes begins with the first egg laid, young birds of different sizes being frequently found in the same nest, and this difference is too great to attribute to sex alone. Mr. Austin F. Park, of Troy, New York, writes me on this subject as follows: "On June 4 and June 11, 1888, I received three young Red-shouldered Hawks in the down, all taken from the same nest. These birds varied greatly in size. I kept the three chicks, fed them well, and noted the rates of growth of the wing and tail quills. I estimated from the length of these that there was about four days' difference in the stages of growth. Further experiments with others confirmed this opinion."

Incubation lasts about four weeks, and the eggs are deposited at intervals of two and sometimes three days. As said before, the number laid by this species varies from two to six. Sets of three are most frequently found, and are a fair average number. About one set in three contains four eggs.

In shape these range from ovate to short and rounded ovate, and a few are perfect oval. The ground color varies from a dull white to a pale yellowish, and again a pale bluish white. Unspotted eggs are very rare, and even faintly marked ones are not common. The majority are all more or less heavily smeared, blotched and spotted, with different shades of reddish brown, fawn color, écru-drab, vinaceous buff, and pearl gray. Some of the lighter tints are shell-markings. In some eggs the markings are few, but large and bold; in others they are finer, of smaller size, and more profuse, hiding the ground color to a considerable extent. They are generally irregularly blotched, and in a limited number of specimens these run longitudinally, as in the egg of Swainson's Hawk (figured on Pl. 8, Fig. 6). They show an almost endless variety of patterns, and there is practically no difference in this respect between the eggs of this species and its two geographical races, excepting that those of typical *Buteo lineatus alleni* from Florida are considerably smaller, as will be seen hereafter. The shells of these eggs are close grained, finely granulated, and without luster.

The average measurement of a series of one hundred and seventeen eggs of this species, from various points of eastern North America, is 54.5 by 43 millimetres. The largest egg measures 59 by 47, the smallest 51 by 41 millimetres. The latter is from Locust Grove, New York, the former from East Hampton, Connecticut, both from Dr. C. Hart Merriam's collection.

Ten specimens, collected by Mr. J. A. Singley, near Giddings, Lee County, in central Texas, give an average measurement of 54 by 44.5 millimetres, being fully as large as eastern specimens. I am inclined to think that though perhaps not referable to typical *B. lineatus*, they resemble more closely the eggs of this subspecies than those of the Florida Red-shouldered Hawk.

The type specimens selected to show some of the various patterns of coloration, are as follows: No. 12873 (Pl. 7, Fig. 1), a single very dark colored egg, was collected by Mr. Robert Ridgway, of the Smithsonian Institution, near Mount Carmel, Illinois, April 1, 1867; No. 21688 (Pl. 7, Fig. 2), from a set of four collected by Dr. C. Hart Merriam, near Locust Grove, New York, April 24, 1878; No. 23942 (Pl. 7, Figs. 3 and 4), two eggs from a set of four, were collected near Giddings, Lee County, Texas, by J. A. Singley, on April 11, 1888; No. 23943 (Pl. 7, Fig. 5), from the same source and locality, from a set of three, and taken April 16, 1888.

## 77. Buteo lineatus alleni Ridgway.

FLORIDA RED-SHOULDERED HAWK.

*Buteo lineatus alleni* Ridgway, Proceedings U. S. National Museum, VII, January 19, 1884, 514.
(B —, C —, R —, C —, U 339*a*.)

Geographical range: South Atlantic and Gulf coasts; south from middle South Carolina (along the coast only?) to Florida: west to southeastern Texas.

The Florida Red-shouldered Hawk is a smaller bird than the preceding subspecies, and as far as yet known its breeding range is confined to Florida and the extreme southern borders of the Gulf coast States, west to southern and (occasionally) central Texas.

Among an interesting collection of birds, made recently by Mr. J. E. Benedict, along the South Atlantic coast in the vicinity of Charleston, South Carolina, is a typical specimen of this form, shot near Georgetown, on Winyah Bay, South Carolina, in about latitude 33° 25′, on January 4, 1891, extending its range considerably to the northward, and probably the breeding range also.

I am indebted to Dr. William L. Ralph for the following notes on this subspecies: "Before the commencement of the disgraceful business of plume hunting which bids fair to exterminate many of the Florida birds, the little Sparrow Hawk was the commonest bird of prey in that State, but since then its numbers have been growing rapidly less, and now this position is held by the subject of this article.

"The following notes were taken in St. Johns and Putnam Counties, where, excepting that part of the former which borders on the Atlantic Ocean, the Florida Red-shouldered Hawk is very common. In fact, I have seen very few of these birds—and none during the breeding season—in the immediate vicinity of either the east or west coast of this State. It is a resident species, and so far as I can learn, if not molested, it seldom goes very far from the place where it nests. There has been no apparent diminution in their numbers during the last fifteen years, as they are seldom disturbed except in the vicinity of the main routes of travel, where they are more or less shot at by tourists, who, by the way, seem to be their only enemies. However, they will probably before many years have to succumb to the fate that is fast overtaking nearly all Florida birds.

"The localities where they are most commonly found are the flat pine woods, and during the breeding season they frequent these most of the time, nesting in or near the small cypress swamps which are very numerous in these forests, building nearly always in pine and rarely in cypress trees. At other seasons they wander more, and are often seen in the vicinity of houses, but rarely far from their nesting places. During the time they are sitting, these birds move around but little, when not in search of food, and those not on their nests will usually be found perched sleepily on a branch

of some shady tree. One can at this time often approach within a few feet of them before they will fly.

"This variety of the Red-shouldered Hawk seems to be much more sociable than the northern species. I have often during the mating season seen flocks, consisting of from two to four pairs of birds, playing together. They chased one another around in apparent sport, circling through the air and uttering their shrill calls after the manner of the Swallow-tailed Kite.

"Their food consists principally of mice, Florida rats, young rabbits, the small gray squirrel found in this State, and probably an occasional frog or small snake. A very few of the inhabitants of this locality—chiefly those that formerly lived in the North—informed me that these Hawks would catch domestic fowls. I have never seen an occurrence of the kind, although I have lived for twelve winters and springs where both these birds and poultry were common.

"The eggs of this bird average considerably smaller than those of the northern subspecies, being but little larger than those of the Broad-winged Hawk. Undoubtedly in the majority of cases two is the number laid, as all their nests, and I have examined a dozen or more, contained either two eggs or two young birds, and most of the eggs found were partly incubated. Where the same species of bird nests both in Florida and in the North, or where a northern bird has a Florida variety, the eggs of the southern bird usually average fewer in number and less in size, and there is less variation in the numbers found in a set.

"I could never distinguish any difference in the call notes of the Florida Red-shouldered Hawk and the northern bird. Both use the same whistle—like 'whee-ee-e,' and the mated birds also assist each other in incubation. They make much ado when disturbed at their nests, but generally take good care not to come too near while these are being examined. I believe but a single brood is raised in a season. I first noticed these birds mating during the present season, about February 1, 1891. The earliest date of nesting was February 20, and young birds just hatched were found by me on March 20.

"The following description of several nests will give a fair idea of their mode of building. I found one on March 8, 1888, four miles east of San Mateo, Florida, in a small cypress swamp. It was situated in a pine tree, in a crotch 57 feet from the ground, and was composed of sticks and lined with pine needles, bits of pine and cypress bark, Spanish and green moss, and a few feathers from the birds themselves. It contained two nearly fresh eggs. Another, found on March 20, 1888, not far from the former locality, was placed in the top of a cypress tree about 65 feet from the ground, and resembled the first one in every respect, except that no Spanish moss was used in the lining of the nest. It likewise contained two eggs, which were about one-fourth incubated. On April 2, 1888, I found a third, about 6 miles southeast of San Mateo, also near the edge of a small cypress swamp. This was placed

in a pine tree about 40 feet above the ground and similarly constructed. Among the materials used for lining, this nest contained, in addition to those already mentioned, some dry grass and a piece of snake skin; it contained but two eggs, one of these half incubated, the other unfertilized. Several other nests were found, showing little if any difference from those already described, so far as location and the materials used in their construction are concerned. All these nests contained but two eggs, and this seems to be the usual number laid by this race, in that part of Florida, at least."

Mr. W. E. D. Scott says that the Florida Red-shouldered Hawk is common in the vicinity of Tarpon Springs, Hillsborough County, Florida, where he found them mating and nesting generally in March, frequenting flat woods and ponds. The eggs are indistinguishable from those of *Buteo lineatus*, but, as before mentioned, they average considerably smaller. Their ground color is usually grayish white, and the markings appear to vary fully as much as in that subspecies, but are similar.

The average size of sixteen eggs from Florida, all collected by Dr. Ralph, is 50.6 by 42.5 millimetres. The largest of these eggs measures 53.3 by 42.5, the smallest 49.8 by 40.1 millimetres. None are figured, as they are similar to those of *Buteo lineatus* in every respect except size.

## 78. Buteo lineatus elegans (Cassin).

RED-BELLIED HAWK.

*Buteo elegans* Cassin, Proceedings Academy Natural Sciences, Phila., 1855, 281.
*Buteo lineatus* var. *elegans* Ridgway, in History of North American Birds, III, January, 1874, 257, 277.
(B 26, C 352*a*, R 439*a*, C 521, U 339*b*.)

Geographical range: Pacific coast of United States; north to southern Oregon; south to Lower California; (and Mexico?)

The breeding range of the handsome Red-bellied Hawk, as far as yet known, is exclusively confined to the Pacific coast proper, extending into northern Lower California, from about latitude 29° north, through California, to central Oregon, where it is a rare summer resident. While not common in any locality, it is perhaps more abundant in the middle counties of California than anywhere else.

Mr. L. Belding, in his "Paper on the Birds of the Pacific District," makes the following remarks about this bird: "Upper Sacramento Valley. Apparently rare; probably resident, though not seen by me later than October 20. It is very common about Stockton in summer; nearly as common in the breeding season as the Red-tailed Hawk. I knew of a pair nesting within less than 200 hundred yards of a residence where poultry was plentiful and easily obtained. They nested there three consecutive seasons unmolested by the occupants of the dwelling. I shot the female as she flew from the nest, April

4, 1880. Her stomach contained several small lizards, a tree frog (*Hyla*), grubs, and insects. May 11, 1879, there were three young in the nest that weighed about a pound each. Mr. Charles Moore, who climbed the large oak in which the nest was placed, reported a lining of green, but dried and broken leaves in the nest, about 3 inches deep in the center. On April 4, 1880, there were three nearly fresh eggs in the nest, which this year had a lining of the lace-like lichen (*Ramalina retiformis*) found on the oaks in the vicinity, a sample of which was brought down from the nest by Mr. George Ashley, who, with great difficulty, secured the eggs.[1]

"I saw one of these Hawks at Stockton, January 25, 1885, repairing an old nest. This, too, was near a farmhouse where fowls were abundant, but I doubt if they often attack poultry, though I have known them to catch small birds."[2]

Mr. A. M. Ingersoll found it nesting near Los Angeles, California, usually in large sycamore or cottonwood trees, and says the nest is generally placed farther out on the branches than is the case with other Buteos.

Mr. F. Stephens writes me: "I find the Red-bellied Hawk rather rare in the region I have lived in, in southern California, but I think it is probably more common in the lower valleys near the seacoast. I found a single nest on April 7, 1882; this was placed near the end of a large limb of a cottonwood tree, about 35 feet from the ground, in San Mateo Cañon, 15 miles east of Colton. It was composed of twigs and lined with the inner bark of cottonwood and a few feathers; inside diameter 6 inches, depth 2 inches. The nest contained three eggs, and incubation had begun."

Mr. B. T. Gault found it common among the oak groves skirting the banks of the San Joaquin River, and noticed several also among the sycamores bordering the little stream running through the Santa Margarita Valley, on the road from San Diego to San Bernardino, California.

Prof. B. W. Evermann reports it not uncommon in the vicinity of Santa Paula, Ventura County, California, where he found their nests in sycamores, live oaks, cottonwoods, and willows, near the borders of streams. He says that he found as many as five eggs in a nest, and gives four as the average number laid to a set.

Mr. A. W. Anthony sends me the following notes on this subspecies: "The Red-bellied Hawk is not uncommon along the coast ranges of Lower California, nesting as far south at least as latitude 29°, and reaching here an elevation of about 2,000 feet. Nests were frequently seen in giant cactus and candlewoods, near San Fernando, Lower California. The only one I took was built in a small sumac scrub, 10 feet from the ground, near San Quintin, Lower California. It was simply a platform of small sticks and twigs, 12 or 14 inches in diameter and about 3 inches in depth, lined with a few dried leaves

[1] These eggs (No. 18088) are now in the U. S. National Museum collection, having been kindly presented by Mr. L. Belding, with numerous other valuable specimens, and measure as follows: 54 by 43, 55.5 by 43, 53 by 43 millimetres.

[2] Occasional Papers of California Academy of Sciences, II, 1890, pp. 34, 35.

of the sumac. The eggs, which were taken on April 30, three in number, contained large embryos."

I met with the nest of this Hawk on two occasions only during the spring of 1878, in the vicinity of Camp Harney, Oregon, where it is a summer visitor. I found the first one on April 17, 1878, and as the bird was unknown to me, shot the female, whose lower parts were of a uniform chestnut red throughout, and proved to be of this race. The nest was placed in a young pine on some limbs close to the top and the trunk of the tree, near the sources of Archies Creek in the foothills of the Blue Mountains and on the outskirts of the heavy timber. It was principally composed of sagebrush twigs, lined with pine needles, the inner bark of juniper trees, and a few green willow twigs with the leaves on. It measured about 18 inches in outer diameter and about 6 inches in depth. Inside it was about 8 inches in diameter by 2 inches deep. It contained two handsome fresh eggs, and another would have been laid, as I found on skinning the parent.

On May 6, during another visit to this locality, I discovered a second nest of this race still farther up this creek. This was placed in a tall juniper tree, likewise near the trunk and about 20 feet from the ground, composed of similar materials, and contained a single egg.

The principal call note when disturbed about its nest is a shrill "yee-ak, yee-ak," uttered rapidly and in a high key.

The number of eggs to a set varies from two to five; sets of three seem to be most frequently found. Judging from the limited number of these eggs seen by me, they appear to be not as heavily blotched and spotted as are those of *B. lineatus*, and the neutral tinted shell markings, such as pearl gray and lavender, predominate in them over the bolder brown and russet markings. Otherwise they do not differ materially in size, shape, or general appearance from the eggs of the Red-shouldered Hawk.

The average measurement of six eggs in the U. S. National Museum collection is 54 by 43.5 millimetres. The largest of these eggs measures 55.5 by 44.5, the smallest 53 by 43 millimetres. The type specimen, No. 20746, from a set of two, Bendire collection (Pl 6, Fig. 9), was taken by the writer, on April 17, 1878, near Camp Harney, Oregon.

## 79. Buteo abbreviatus Cabanis.

ZONE-TAILED HAWK.

*Buteo abbreviatus* Cabanis, in Schomburgk, Reise in British Guiana, III, 1848, 739. (B —, C 353, R 440, C 522, U 340.)

Geographical range: Middle America; north to Lower and southern California, Arizona, Texas, etc.; south to northern South America.

The breeding range of the Zone-tailed Hawk is rather a restricted one within our borders. As far as is yet known it is confined to the southwestern portions of the United States, from Comal and Presidio Counties in central

and southwestern Texas, through southern New Mexico, and central and southern Arizona. It probably breeds occasionally in southern California, where Dr. J. G. Cooper obtained the first specimen taken within the limits of the United States. It was shot 30 miles north of San Diego and 5 miles from the coast, on February 23, 1862.

It has been noted by Mr. L. Belding at the Cape St. Lucas region of Lower California; and Mr. A. W. Anthony writes me that he found it not uncommon on the San Pedro Martir Mountains in latitude 31°, at an elevation of about 7,000 feet. Two pairs of these birds were seen by him on April 24, both nesting in tall pines. He states: "The birds were greatly worried at our presence, flying about overhead and constantly uttering a loud querulous cry, not unlike that of *Buteo borealis*. One of the nests, examined from the ground, was rather a bulky affair of sticks, and placed in the very top of a pine about 70 feet up. Several shots from our rifles failed to drive the birds away. Shortly afterward a second pair were seen, and one of these was secured."

They are a common Mexican and Central American bird, and only summer visitors with us.

The first description of the supposed nest and eggs of the Zone-tailed Hawk, published in any of our ornithological papers, is that of Mr. William Brewster in the Bulletin of the Nuttall Ornithological Club (Vol. IV, April, 1879, p. 80), from specimens collected by Mr. William H. Werner in Comal County, Texas, on May 17, 1878. Mr. Brewster, in speaking of this find, says: "The nest, a large bulky structure, composed of coarse sticks, with rather a smooth lining of Spanish moss, was built in a cypress tree on the bank of the Guadalupe River. It was placed on a large and nearly horizontal branch, about 15 feet out from the main stem, and at least 40 feet above the ground. It measured as follows: External diameter 20 inches; external depth 6 inches; internal diameter 7 inches; internal depth 4 inches. The two eggs which it contained were slightly incubated. One is still preserved with the nest, the other is in Mr. Ricksecker's collection. The latter measures 2.09 by 1.55 inches (about 53.1 by 39.4 millimetres). It is marked with blotches of reddish brown upon a dull white ground. These blotches occur most thickly about the larger end, where they tend to form a nearly confluent ring. In Mr. Werner's specimen, which is similar in color, the markings are most numerous around the smaller extremity. Its dimensions are 2.06 by 1.53 inches (about 52.3 by 38.9 millimetres). Although the parent birds belonging to this nest successfully eluded all attempts at capture, their identity can scarcely be doubted. As Mr. Werner was climbing to their eyrie, they swept down about his head, repeatedly passing within a few feet of him As but a few days previously he had shot the specimen above referred to [which is quoted in the beginning of this article and not copied by me] it is not likely that he could have mistaken a species so distinctly marked."

Mr. Stephens published subsequently the following account: "May 28, 1876, I found a nest of *Buteo zonocercus* in a very large cottonwood tree, in a grove of the same, in the mouth of a cañon of the Gila River, in New Mexico, about 20 miles above the Arizona line. I saw the parent fly from the nest and with its mate circle around overhead. One alighted on the cliff overhanging the grove, which I succeeded in killing. It proved to be the male. I had no climbers and could not then get to the nest, but the next day I returned with a rope and succeeded in getting near enough to work my hand up through the nest and reach one egg, which was all there was. The nest was quite bulky, composed of twigs lined with strips of the inner bark of the cottonwood.

"The egg was very near hatching, and in attempting to extract the embryo I broke it, and it has since been broken into small pieces. It was marked with large reddish brown blotches, irregularly distributed on a dirty white ground. I still have the male parent."[1] Mr. Stephens sent me the pieces of this egg, which were all small, but as described above.

The next published account of the nesting habits of the Zone-tailed Hawk, and by far the most complete, is one by Asst. Surg. Edgar A. Mearns, U. S. Army. It is too long to quote fully, and I extract only such portions as are of special interest.

Dr. Mearns found his first nest of this species while camped in a grove of cottonwood trees upon the banks of New River, Arizona, May 16, 1885. While he was resting in the shade, a shrill whistle drew his attention to a Hawk that came gliding toward him through the dark shadows of the dense foliage. A quick shot brought the bird to his feet. On searching the vicinity he was not long in discovering a bulky nest fixed in the forks of a large cottonwood branch across the stream, at an elevation of about 25 feet, and the female parent standing upon it. She gave a loud whistle and came skimming toward him, and was also shot. The nest was coarsely built of rather large sticks, with considerable concavity, lined with a few cottonwood leaves only, and contained a single egg of a rounded oval shape, slightly smaller at one end, in color clear bluish white, immaculate, and measuring 55 by 43 millimetres. On dissecting the female he discovered that two would have been the full complement for this pair.

The doctor encamped the next day at the Aqua Frio. He says: "Here I again found the Zone-tailed Hawk. A female was shot as she flew screaming at me, and the nest was soon found in a cottonwood tree near by. The male parent sat upon the eggs and flew away when I got close up to the tree and shouted. It disappeared after circling over the cañon a few times, and did not return while I was there, although I spent several hours in the vicinity. I climbed with vast exertion to the nest, which was built in a fork about 50 feet from the ground and was exactly like the first one. It was composed of sticks,

[1] Bulletin of the Nuttall Ornithological Club, Vol. IV, July, 1879, p. 189.

lined only with green leaves of cottonwood attached to the twigs. It was rather concave, and contained two eggs which differ considerably in size, shape, and markings from those first found, but there can scarcely be any doubt about the identification, for the female was shot close to the nest, while the other bird was distinctly seen when flying from it, and was black, having its tail barred with white below. Perhaps, however, it is safest to say that these eggs are not absolutely free from the suspicion of being those of *Urubitinga anthracina*, as the parent seen to leave the nest was not shot. They are oval, considerably smaller at one end, ground color white, with yellowish weather stains in spots. One measures 63 by 45 millimetres. It is finely sprinkled with dark sepia-brown specks, and a few paler brown and lavender spots, having a smeary granular appearance. All the marks are most numerous at the large extremity. The other measures 61 by 43 millimetres. It is evenly blotched with very pale yellowish brown and lavender. Both contained large embryos and were emptied of their contents with difficulty."[1]

Several years previous to these accounts I met with the Zone-tailed Hawk on Rillitto Creek, Arizona, and found my first nest of this species on April 22, 1872, but as neither of the parents was procured with the eggs I did not at the time describe them. They were summer residents only, and I saw the first pair of "Black Hawks" on April 4, 1872. On the 6th I noticed another pair, which were just commencing to build a nest in a tall cottonwood tree, in a large grove about a mile above my camp. Neither pair of these birds showed any shyness, allowing me to approach closely to them; and, with the assistance of an excellent field glass, I took careful observations of them at different times while they sat at rest on some dead limb where they could be plainly seen.

On April 22, while riding along the banks of Rillitto Creek, which even at that early date had dried up, leaving only a stagnant water hole here and there, I noticed one of these Black Hawks flying up the creek bed, and being at leisure I followed it. Some 5 miles above my camp, near the entrance to Sahuaritto Pass, it perched on a dead limb of a large cottonwood tree on the west side of the creek. On nearing this, I saw an old and bulky nest placed in a fork close to the main trunk of the tree, about 40 feet up, and the mate of the bird I had been following sitting on the nest. As my principal object was to study the nesting habits of our birds, as well as to collect their eggs, I refrained from shooting either of them, which I might easily have done at the time. On climbing to the nest I found it contained but a single pale bluish white unspotted egg. The old birds during this time were circling around above the tree giving vent to shrill screams. Being some distance from camp I took this egg, and had not moved more than a hundred yards away from the tree before one of the birds, presumably the female, settled on the nest again as if nothing had happened. As the set was certainly not

[1] Auk, Vol. III, January, 1886, pp. 64–69.

complete, I concluded to pay them a second visit and secure the other eggs and one of the parent birds also. On reaching camp and blowing the egg, I found it quite fresh.

On May 3, I paid a second visit to this locality and found one of the birds on the nest, where it remained until I rode up to the tree and rapped on it with the butt of my shotgun. This caused it to fly off about 50 yards farther up, on the opposite side of the dry creek bed, where it alighted in a smaller tree. As the bird appeared so very tame I concluded to examine the nest before attempting to secure the parent, and it was well I did so. Climbing to the nest I found another egg, and at the same instant saw from my elevated position something else which could not have been observed from the ground, namely, several Apaché Indians crouched down on the side of a little cañon which opened into the creek bed about 80 yards farther up. They were evidently watching me, their heads being raised just to a level with the top of the cañon.

In those days Apaché Indians were not the most desirable neighbors, especially when one was up a tree and unarmed; I therefore descended as leisurely as possible, knowing that if I showed any especial haste in getting down they would suspect me of having seen them; the egg I had placed in my mouth as the quickest and safest way that I could think of to dispose of it—and rather an uncomfortably large mouthful it was, too—nevertheless I reached the ground safely, and, with my horse and shotgun, lost no time in getting to high and open ground. I returned to the place again within an hour and a half looking for the Indians, but what followed has no bearing upon my subject. I only mention the episode to account for not having secured one of the parents of these eggs. I found it no easy matter to remove the egg from my mouth without injury, but I finally succeeded, though my jaws ached for some time afterward. On blowing it the next day I found it slightly incubated. It was unspotted like the first. The nest was evidently an old one which had been used for many years. It was quite flat on top and sparingly lined with cottonwood bark.

On May 17, a set of three eggs were brought to me by two of my men who were familiar with the appearance of these birds. The nest was in a similar situation in a large cottonwood tree near the sink of the Santa Cruz River, about 10 miles northeast of Tucson. These also were unspotted and nearly fresh.

At that time I was not aware that the Mexican Black Hawk was found in Arizona, but on a subsequent visit to Washington, District of Columbia, in the fall of 1874, while examining specimens of both *Buteo abbreviatus* and *Urubitinga anthracina*, I saw plainly that I had accurately described a peculiar plumage of the latter species which is not found in *Buteo abbreviatus*, and on showing my original notes to Mr. Robert Ridgway, of the Smithsonian Institution, he fully agreed with me that my description of a bird seen on April 4, 1872, plainly referred to the Mexican Black Hawk. On the strength of this, as well as of the description of the eggs of *Buteo abbreviatus* being spotted,

based on Stephens's and Werner's identification, I naturally came to the conclusion that the eggs taken by me in Arizona were clearly referable to the Mexican Black Hawk and none other.

Even Dr. Mearns's subsequent article on these two species published in the Auk (Vol. III, January, 1886, pp. 60–73), did not shake my faith in my correct identification of these eggs. after having examined specimens of the two species. This was further strengthened by a letter from Mr. William Lloyd, who wrote me that he had found a nest of *Urubitinga anthracina* on April 13, 1890, in Presidio County, Texas, and having shot the female, he found a fully developed egg in her oviduct. This was badly broken; he sent me the pieces, however, and Mr. F. A. Lucas kindly restored the specimen very skillfully. This egg was likewise bluish white in color, unspotted, and measured 54 by 42 millimetres; it was in fact an exact counterpart of Dr. Mearns's egg of *Buteo abbreviatus*, and of my supposed eggs of *Urubitinga anthracina*. I was naturally anxious to see the parent, and this, on examination, proved to be a Zone-tailed Hawk.

I am satisfied now that Dr. Mearns was perfectly right in his surmise, that the birds found by me breeding in Arizona in 1872 were really *Buteo abbreviatus* as I originally supposed, and I am equally certain that some of the notes taken by me at the time, and which will be quoted in their proper place, are positively referable to *Urubitinga anthracina*, and show clearly that I met with both species.

The Zone-tailed Hawk is pretty generally distributed over the greater portion of Arizona during the breeding season, and is not especially rare. A pair or two may be found inhabiting all the larger cottonwood groves in the Territory, and it seems to be especially partial to such trees to nest in, they usually being found only along the banks of the few streams in this poorly watered country. According to Dr. Mearns, its food consists of lizards, frogs, and fishes, but small mammals are undoubtedly also included in its bill of fare.

It usually makes its appearance from the south in the beginning of April, and but a single brood is raised in a season. Both sexes assist in incubation, which, as with our larger Raptores, lasts about four weeks. The eggs vary from one to three in number, usually two, and seem to be for the most part unspotted. They are oblong oval in shape, pale bluish white in color, and the shell is rather smooth and finely granulated.

According to Messrs. Stephens and Werner the eggs are occasionally spotted, and I have no reason to doubt their identification. Nidification commences in the latter part of April and lasts through May.

The egg taken by Dr. Mearns near New River, Arizona, on May 16, 1885, about which there can be no possible doubt as to its identification, both parents being shot at the same time, and which is now before me, measures 54 by 43 millimetres, and is figured on Pl. 7, Fig. 6, as the type of this species, having been kindly loaned to me by the American Museum of Natural History, New York City, New York, to which collec-

tion it belongs. The eggs of this species from near Tucson, Arizona, measure as follows: First set, 53 by 43 and 54.5 by 42.5 millimetres; second set, 53.5 by 42, 53.5 by 42, and 55 by 41 millimetres. Mr. William Lloyd's specimen, from Presidio County, Texas, measures 54 by 42 millimetres. On none of these eggs are any markings visible.

## 80. Buteo albicaudatus VIEILLOT.

WHITE-TAILED HAWK.

*Buteo albicaudatus* VIEILLOT, Nouveau Dictionaire, IV, 1816, 477.
(B —, C —, R 441, C 513, U 341.)

GEOGRAPHICAL RANGE: Whole of Middle America; north to southern Texas; south to portions of eastern South America.

This common Mexican and South American species, easily recognized by its pure white underparts, is an abundant resident of the Gulf coast of Texas and the lower Rio Grande Valley, the only localities within the United States where it has been found to breed, as far as known at present.

I believe that my friends, Dr. James C. Merrill, U. S. Army, and Mr. George B. Sennett, who have both contributed so much to our knowledge of the ornithology of the Lower Rio Grande, of Texas, were the first naturalists who obtained the nest and eggs of this handsome Hawk within our borders. The former, in speaking of this species, says: "This fine Hawk is rather a common resident on the extensive prairies near the coast, especially about the sand ridges covered with yuccas and cactus. Its habits appear to be like those of the allied species of Prairie Hawks. On the 2d of May, 1878, I found two nests, each placed in the top of a yucca growing in Palo Alto prairie about 7 miles from the fort. The nests were not more than 8 feet from the ground, and were good sized platforms of twigs with scarcely any lining. While examining these nests, the parents sailed in circles overhead, constantly uttering a cry much like the bleating of a goat. Each nest contained one egg. The first was quite fresh and measures 2.35 by 1.91 inches (about 59.7 by 48.5 millimetres). It is of a dirty white color with a few reddish blotches at the smaller end. The second egg was partly incubated. It resembles the first one, but the reddish blotches are rather sparingly distributed over the entire egg. It measures 2.35 by 1.85 inches (about 59.7 by 47 millimetres)."[1]

In the spring of 1882, while on a collecting trip on the Gulf coast, near Corpus Christi, Texas, Capt. B. F. Goss found this species breeding abundantly in that vicinity. He writes me: "We found the favorite breeding places of the White-tailed Hawks to be a strip of open bushy land lying between the thick line of timber and chaparral along the coast and the open prairie. Any bush rising a little above the surrounding level seemed a suit-

[1] Proceedings U. S. National Museum, Vol. I, 1878, pp. 156, 157.

able nesting site, and no attempt was made to conceal the nest. In most cases it was very prominent, and could be seen for a long distance. I examined fifteen; they were all placed in low bushes, generally not higher than 6 feet. In a few cases I had to stand upon the wagon to reach them They were composed of sticks, dry weeds, and grasses. A coarse dry grass entered largely into the composition of most of them. They were poorly constructed, but moderately hollowed, and usually lined with a few green twigs and leaves. Taken as a whole, the nests looked ragged in outline and slovenly finished. About one nest in four contained three eggs, the rest but two. This Hawk is wary and difficult of approach at all times. They would leave their nests as soon as we came in sight, sometimes when still half a mile away, and generally they kept entirely out of sight. An occasional pair sailed high over our heads, uttering a faint cry while we were at their nest. Only a single one came within range of our guns. The earliest date on which eggs were found was March 5; the latest April 25." During the spring of 1884 Captain Goss's collector took eggs of this species on February 1, and in 1885 as late as July 4. Only one nest was 11 feet from the ground; the others were all lower, generally from 4 to 8 feet up.

Nothing is mentioned about the food of this species by any of our ornithologists who have met with it in southern Texas. Mr. W. H. Hudson says, in speaking of the habits of the White-tailed Hawk in the Argentine Republic: "I have dissected a great many and found nothing but Coleopterous insects in their stomachs; indeed they would not be able to keep in such large companies when traveling if they required a nobler prey. At the end of one summer, a flock numbering about one hundred birds appeared at an 'estancia' near my home, and though very frequently disturbed they remained for about three months roosting at night on the plantation trees and passing the day, scattered about the adjacent plain, feeding on grasshoppers and beetles. This flock left when the weather turned cold; but at another 'estancia' a flock appeared later in the season and remained all winter. The birds became so reduced in flesh that after every cold rain or severe frost numbers were found dead under the trees where they roosted; and in that way most of them perished before the return of spring."[1]

The usual number of eggs laid by this species is two; sets of three are not uncommon however, and occasionally but a single egg seems to be laid. The eggs are large for the size of the bird. Nidification, some seasons at least, begins very early, full sets of eggs having been taken on February 1, 1884, and again it is protracted well into July, as several fresh sets of eggs in the collection here attest. This may have been caused by repeatedly robbing them of their eggs, or perhaps they raise two broods in a season.

The eggs of the White-tailed Hawk are dull dirty white in color, faintly and sparingly marked with irregular small blotches of pale brown and drab. An occasional specimen shows a few small lavender shell markings also.

[1] Argentine Ornithology, Vol. II, 1889, p. 61.

About one-third of the eggs are unspotted. In shape they vary from an elliptical oval to an oval. Now and then one occurs that may be designated as elliptical ovate. The shell is fairly smooth and close grained.

The average measurement of fifteen eggs of this species in the U. S. National Museum collection is 60 by 47.5 millimetres; the largest egg measuring 65 by 50, the smallest 55 by 44 millimetres.

The type specimen No. 22581, selected from a set of three, taken March 8, 1882 (Pl. 7, Fig. 8), is the heaviest marked egg of the series, but in another egg of this set the spots, while fewer, are darker colored, and No. 22583, from a set of two, taken April 4, 1885 (Pl. 7, Fig. 9), shows but a trace of a faint spot here and there, and resembles an unspotted egg. Both these sets were obtained in exchange from Capt. B. F. Goss, and were taken near Corpus Christi, Texas.

## 81. Buteo swainsoni Bonaparte.

SWAINSON'S HAWK.

*Buteo swainsoni* Bonaparte, Geographical and Comparative List, 1838, 3.
(B 18, 19, 21, 28, C 354, R 442, C 523, U 342.)

Geographical range: Western North America; north to Alaska and western side of Hudson Bay; east to Wisconsin, Illinois, and Arkansas (casually to Massachusetts); and south through Central America and greater part of South America to the Argentine Republic.

Swainson's Hawk has a wide distribution during the breeding season. Commencing with the southern portion of its range east of the Rocky Mountains—this includes portions of the less densely timbered and prairie regions of Texas and Arkansas—thence northeastward in similar localities to Illinois and Wisconsin; north and westward through the intervening States and Territories into the Dominion of Canada from Manitoba, westward and north to the Arctic regions in about latitude 65°. West of the Rocky Mountains it is found in New Mexico and Arizona, and over the entire Pacific coast region north into British Columbia and Alaska.

On the arid wastes and table lands of southern Arizona, as well as in the sage and bunch grass districts of Nevada, Oregon, Washington, and Idaho, Swainson's Hawk is especially abundant, outnumbering, perhaps, all the other Raptores of these regions combined. It is eminently a prairie bird, shunning the densely timbered mountain regions, and being more at home in the sparingly wooded localities usually found along the water-courses of the lowlands.

Compared with the majority of our Hawks it is gentle and unsuspicious in disposition, living in perfect harmony with its smaller neighbors. It is no unusual sight to find other birds, such as the Arkansas Kingbird, *Tyrannus verticalis*, and Bullock's Oriole, *Icterus bullocki*, nesting in the same tree; and the first-mentioned species goes even further than this, sometimes constructing its

home immediately under the nest of these Hawks or in the sides of it. Two such instances came under my personal observation.

The food of Swainson's Hawk consists almost entirely of the smaller rodents, principally striped gophers and mice, as well as grasshoppers and the large black cricket, which is very common as well as destructive in certain seasons, and the bane of the farmers in eastern Oregon, Washington, Idaho, Nevada, and other localities in the Great Basin, destroying and eating up every green thing as they move along. Even the bitter leaves of the sage bush, *Artemisia*, are not despised by these pests, and while these last they constitute their principal food. From almost daily opportunities enjoyed by me for years of observing this bird, I do not hesitate to say that aside from an occasional half-grown hare or rabbit, which from their abundance in some of the regions referred to are themselves considered as quite a nuisance, its daily fare consists almost exclusively of such food as I have mentioned.

I cannot recall a single instance where one of these birds visited a poultry yard; and if other food is procurable it will seldom molest a bird of any kind. From an economic point of view I consider it by far the most useful and beneficial of all our Hawks. It is found in a great variety of plumages and in some stages it is an exceedingly handsome bird.

In the more northern portions of its range it is only a summer resident, migrating regularly in large straggling flocks. In the fall of 1881, while encamped near the Umatilla Indian Agency, in Oregon, I noticed numbers of these birds passing; I should think that not less than two thousand of them flew by in straggling bands and settled down on the foothills a few miles south of the agency. They were evidently returning from their breeding grounds in the North, and as they flew rather low could be readily identified, although they varied greatly in plumage. As near as I could tell this body of Hawks seemed to be almost exclusively composed of this species.

On the eastern slopes of the Rocky Mountains it winters from about latitude 39° southward, a few remaining in favorable localities still farther north. On the Pacific coast I have observed a few wintering in southeastern Oregon in about latitude 42°, the majority passing southward, and the birds remaining are probably such as breed much farther north, replacing the regular summer residents, which in turn move south on the approach of cold weather.

Swainson's Hawk, as a rule, nests late in the season, even in some of the southern portions of its range. This, however, does not seem to hold good everywhere, as Mr. William Lloyd informs me that on the prairies west of Chihuahua, Mexico, he took eggs of this species on March 6; Mr. William Cobb took some in central New Mexico, March 20, and Mr. F. Stephens in southern California on April 16.

In the large series of eggs of this species in the U. S. National Museum collection, consisting of one hundred and sixty-six specimens, which represent nearly every State and Territory west of the Mississippi River, from Arizona to Alaska and the Arctic regions, there is but a single set taken as early as

April 10, this being from southern California. Even the numerous records from southern Arizona fail to show a single date earlier than May 12, by far the greater portion falling in the last ten days of this month and the first week in June. These same dates correspond equally well with the commencement of the breeding season in Oregon, Washington, and Idaho, where I took a number of their nests.

In Wyoming, Montana, the Dakotas, Manitoba, and farther northward, most of the records are in June, a few in July, and a single specimen was taken by Dr. Elliott Coues on St. Marys River, Montana, on August 17, 1874, but this was probably an addled egg.

Swainson's Hawk arrives in its summer home fully a month before nidification commences, and during this period these birds spend considerable time on the wing, sailing and circling around high in the air, uttering their not unmusical notes; at other times they are much more sluggish and are fond of sitting on a dead limb of a tree; a telegraph pole on the plains is a particularly favorite perch of theirs, or a sage bush or some hillock on the prairie, from whence they watch the surroundings for their humble fare. This latter habit of sitting on the ground is rather characteristic of this species.

They rarely build a new nest, the one used the previous year, if not already occupied by some of the earlier breeders, like the American Long-eared Owl, *Asio wilsonianus*, is slightly repaired by the addition of a few sticks and a little lining, or an old Crow's nest is taken possession of and reconstructed to suit; these repairs seldom take more than a day or so, and the nest is then ready for the eggs. The nesting sites of this species vary greatly according to circumstances and locality. In southern Arizona, especially in the vicinity of Fort Huachuca, where this Hawk is a resident and exceedingly common, Lieut. H. C. Benson, Fourth Cavalry, U. S. Army, found forty-one of their nests between May 12 and June 18, 1887. All of these were placed in low mesquite trees, from 3 to 15 feet from the ground. A few found by me near Tucson, in the spring of 1872, were located in similar trees from 10 to 18 feet from the ground.

In southeastern Oregon, as well as in Washington, Idaho, and Montana, I frequently found nests of this species placed in some small bunch of willows growing here and there in marshy places or along the banks of streams, and again in isolated pine trees, straggling patches of junipers, and now and then in mere bushes on side hills of cañons, or near the rims or edges of the sagebrush-covered table lands making out from the mountains proper; never in what might be called a forest country. Solitary trees, no matter how small in size, giving a good outlook over the surrounding country, are, in those regions at least, their favorite nesting sites. With but few exceptions the nests were easily reached and usually placed in a fork close to the main stem, seldom out on one of the larger limbs. Their average height from the ground was not over 20 feet. But a single nest, placed on a large limb of a good sized cottonwood on the Umatilla River, Oregon, of all those

found by me, more than thirty in number, was difficult to get at and much higher from the ground than usual. It was fully 50 feet up, and contained but a single fresh egg on May 28, 1882. The nests varied considerably in size and bulk, but rarely averaged more than a foot and a half wide by a foot in depth. The top of the nest was usually rather flat, and in most instances fairly well lined with either dry grass, weed stalks, dry cottonwood, or juniper bark. A few were lined with green willow tops, and now and then I found one with scarcely any lining. They are not neatly constructed and have a ragged looking appearance from the outside; frequently a streamer or two of juniper bark hangs down from the sides of the nest, giving it a very dilapidated appearance, and many times, had I not been able to see the bird on the nest, I should certainly have taken it for an abandoned one.

Capt. B. F. Goss says: "I found this species breeding in North Dakota in the high timber along the streams, from 40 to 60 feet up, and in low brush patches on the prairies in the lake region, where the nests were but 2 to 4 feet from the ground; I also found nests on the ground in the open prairie. I think from appearances there has been brush growing where I found these nests, and the birds became attached to the locality, and continued to use it after the bushes had been burned off by the prairie fires so common in those regions. I also found it breeding in the heavy timber along the Nueces River in southern Texas."

Mr. F. Stephens says: "Swainson's Hawk arrives in southern California in the early spring, in flocks, many remaining in the larger unsettled valleys to breed. I have seen hundreds in sight at once, scattered over the plain, on the ground, where they sit most of the day, after gorging themselves on beetles and especially grasshoppers. At night they roost in the nearest trees or on rocky hillsides. On one occasion I took a set of eggs of this species, and a set of *Icturus cucullatus nelsoni* from a nest pendant from some of the twigs composing the Hawk's nest; another time I found nests of *Tyrannus verticalis* and *Carpodacus mexicanus frontalis* built in the mass of the Hawk's nest, all occupied at the same time."

Mr. Lynds Jones states that in Iowa this Hawk usually constructs its nest in moderately timbered tracts, usually in oak or elm trees, from 30 to 80 feet up, the nesting season beginning in the first half of May, their nests being often lined with leaves. Their call note, aside from a peculiar gurgling sound made while diving through the air, resembles the word "pi-tick, pi-tick," frequently repeated.

In Montana, according to Mr. R. S. Williams, fresh eggs may be looked for in the last week in May. The nests here are usually placed in low cottonwoods from 12 to 15 feet from the ground and near the center of the tree.

Mr. J. W. Preston found a pair of these birds nesting in a Blue Heron's deserted nest, near Baxter, Iowa. He says: "Although a bird of graceful form and often of pleasing movement, it is the most careless in habits of

any of our Hawks. 'Tame' is an appropriate epithet. A pair spent many days in rebuilding an old nest of the common Crow 15 feet up in a small tree, directly over a road in a wood and in plain sight, yet the birds evinced no more concern about the passers-by than a Bantam hen would do. It is popularly known as the Prairie Hawk here, and so it is, but it often nests in the bordering groves." According to Mr. W. H. Cobb, in New Mexico they occasionally nest in cañons or the sides of cliffs under an overhanging rock. Here they feed principally on hares and wood rats, and remains of snakes have been found in one of their nests.

A nest whose contents are now in the U. S. National Museum collection, taken at the forks of Milk River, Montana, on July 17, 1874, by Dr. Elliott Coues, was placed against the face of a perpendicular earth bank 100 feet high, on a slight projection of the ground about half way up. It contained two eggs in which incubation was far advanced. Nests have also been found in live oaks, sycamores, and aspens.

Lieutenant Benson found Swainson's Hawk living in harmony with other birds and writes me that after the Arkansas Kingbirds began to build he invariably found one of their nests in each tree that contained one of the former. In one case a pair of these Flycatchers had placed their nest directly under and but 8 or 9 inches from that of the Hawk. A pair of White-rumped Shrikes nested also directly under one of these Hawk's nests. On another occasion he found rather a strange occupant in a nest of this species, and it is questionable if, in this instance at least, the usually good-natured Swainson's Hawk would not have resented the intrusion. This visitor was a good-sized rattlesnake which had managed to climb up the low bushy tree and coiled itself comfortably in the nest.

But one brood is raised in a season. If the first set is taken they will frequently lay a second one consisting of one, seldom two eggs, and use the same nest again as a rule. Incubation lasts about twenty-eight days, both sexes assisting, and the eggs are deposited at intervals of about two days.

The number of eggs to a set varies from two to four. According to my own experience, and that of Lieutenant Benson as well, the number most often found is two. About one nest in four contains three eggs, and a set of four is rarely met with. I found but one such in over thirty nests, and the only other set in the collection was taken by Mr. Ernest E. Thompson, near Carberry, Manitoba, June 8, 1883. My set of four was taken near Fort Lapwai, Idaho, May 28, 1871.

In shape these eggs vary from a short ovate to an oval, and their shells are rather smooth and close grained. Their ground color when fresh is a very distinct greenish white which in course of time fades into a dull yellow white. When not closely looked at many of the eggs of Swainson's Hawk appear to be unspotted, but on careful examination there are in reality very few that are immaculate. The majority are more or less distinctly spotted and blotched

with different shades of brown, such as burnt umber, liver brown, hazel, and tawny, and of clay color, French gray, and drab gray. With but very few exceptions none of the eggs are heavily marked; about one-half are, however, moderately well spotted.

The average size of one hundred and sixty-six specimens in the U. S. National Museum collection is 56.5 by 44 millimetres. The largest egg of the series, one taken by myself at Fort Lapwai, Idaho, measures 62 by 46.5 millimetres, the smallest, taken by Lieut. H. C. Benson, at Fort Huachuca, Arizona, measures but 50.5 by 40.5 millimetres. As is usually the case, the eggs from the northern breeding ranges average larger in size than those from the southern.

The type specimens selected to show the principal variations found in these eggs are: No. 20713 (Pl. 8, Fig. 1), from a set of two taken near Camp Harney, Oregon, May 12, 1875; No. 20733 (Pl. 8, Fig. 2), a very peculiarly marked egg from a set of four, taken near Fort Lapwai, Idaho, May 28, 1871; No. 20740 (Pl. 8, Fig. 3), a single egg, and very distinctly marked, was taken near the Umatilla Indian Agency, Oregon, May 28, 1882; these are from the Bendire collection. No. 23139, two eggs from same set, very handsomely marked (Pl. 8, Figs. 4 and 5), taken near Fort Huachuca, Arizona, May 27, 1887, and No. 23150 (Pl. 8, Fig. 6), from the same locality, taken June 18, 1887, were collected by Lieut. H. C. Benson, Fourth Cavalry, U. S. Army, who made an exceedingly interesting collection of both birds and eggs of that then slightly explored region; and he generously presented them all to the U. S. National Museum.

## 82. Buteo latissimus (Wilson).

BROAD-WINGED HAWK.

*Falco latissimus* Wilson, American Ornithology, vi, 1812, 92, Pl. 54, Fig. 1.
*Buteo latissimus* Sharpe, Catalogue of Birds in British Museum, i, Accip., 1874, 193.
(B 27, C 355, R 443, C 524, U 343.)

Geographical range: Eastern North America; north to New Brunswick and Saskatchewan; west to edge of Great Plains; south (in winter only?) through Central America and West Indies to northern South America.

The breeding range of the Broad-winged Hawk includes the whole of the eastern United States, from the Mississippi River to the Atlantic Ocean. West of the Mississippi Nehrling found it breeding near Houston, in eastern Texas. Col. N. S. Goss gives it as rare in Kansas, but probably breeding, and it is known to be common in portions of Iowa and Minnesota. It ranges beyond our border into southern Canada, and breeds from Nova Scotia and New Brunswick west to the province of Assiniboia and north to the Saskatchewan plains.

In Florida, South Carolina, and the Gulf coast generally, it seems to be a rare resident, but it has been reported as breeding near Lake Harney,

Florida, and an egg collected by Mr. H. B. Moore, near Manatee, Florida, in the spring of 1872, and now in the U. S. National Museum collection, entered as one of *Buteo lineatus*, is so small that it would seem much more likely referable to this species. Mr. W. E. D. Scott and other well known ornithologists who have collected extensively in Florida during the past ten years, do not appear to have met with it during the breeding season, but as it is reported to breed in Cuba it is reasonable to suppose that the same is true of our southern border. Dr. A. K. Fisher tells me that he saw a pair near Mobile, Alabama, in May, 1886, which acted as if they had a nest in the vicinity.

Throughout the Central and Northern States it is somewhat irregularly distributed, being common in some sections and rare in others. As it is eminently a bird of the larger forests, and seldom seen in the more open and cultivated country, its abundance in certain regions and scarcity in others can be readily accounted for.

Dr. William L. Ralph, of Utica, New York, writes me as follows: "The Broad-winged is the Hawk of the Adirondack wilderness, and it replaces in this locality the Red-tailed and Red-shouldered Buteos which are so common in the smaller woods of the more settled parts of this State. I think that with the exception of the Pigeon Hawk and Goshawk, which probably breed here also but are very rare, they are the only Hawks that nest in the interior of these woods, but along the borders they are sometimes found breeding in the same situations as the more common species.

"They are to be found in considerable numbers in this wilderness, or at least that part of it lying within the counties of Hamilton, Herkimer, and Oneida, but they are evidently rare in the more open country.

"I never met with them during the breeding season in any other locality, with the exception of a small district a few miles south of Utica, where three or four nests have been taken during the last fifteen years. They are very fond of living near water, and their nests are always to be found in close proximity to the lakes and streams which are so numerous in the Adirondack region. The smaller lakes especially are favorite places of resort, and when a pair takes possession of one they apparently hold it against all intruders of their kind.

"I have never seen more than a single pair in close proximity to one of these small lakes. They frequent them on account of the mice, chipmunks, shrews, and frogs that usually live in large numbers along the shores, and which seem to form their principal food.

"Most writers on this species say that it is a very quiet bird, and should one of their nests be disturbed, it will fly silently away and make no protest whatever. Now, while the statement that it is a quiet bird evidently holds good for the greater part of the year, my experience shows that it is just the opposite during the breeding season; then it is as noisy as any Hawk I know of. When one is driven from its nest it at once utters a shrill call,

which soon brings its mate to the spot, and together they will keep up their noise as long as anyone remains in the vicinity. They are very tame in this locality, and frequently when one is started from its nest it will not even leave the tree, but alight on a limb near by. They are gentle in disposition and never attempt to strike at a person, although they are very solicitous about their eggs and young. For days after they have been robbed these birds will utter their complaints when anyone approaches their homes.

"The only note I have heard them utter is a whistle which sounds almost exactly like that given by the Killdeer Plover (*Ægialitis vocifera*). They do not seem to decrease in numbers, probably because they do no harm and consequently are not much hunted; and their usually quiet habits also render them rather inconspicuous. Both parents assist in incubation and seem to be equally solicitous for their eggs and young.

"I took two nests with eggs during the season of 1890. The first was found May 28, about half a mile south of Wilmurt, New York. It was situated in a crotch of a birch tree, 50 feet above the ground, which was growing on a wooded hillside sloping back from a small stream. The materials composing it consisted of sticks and hemlock twigs, and it was lined with hemlock and birch bark. It measured 6 by 9 inches in depth, 15 by 21 inches in diameter, and contained two nearly fresh eggs.

"The second nest was found on May 30, and contained three eggs about three-fourths incubated. It was situated 56 feet above the ground, also in a crotch of a birch tree growing near the bank of West Canada Creek, about 1 mile north of Wilmurt, New York. It was composed of sticks and lined with birch bark, hemlock twigs, and feathers from the sitting bird, and it was a trifle smaller than the other nest."

Mr. J. W. Preston, who has taken a number of the nests of the Broad-winged Hawk in Becker County, Minnesota, writes me as follows: "This Hawk is a common summer resident here, and nests from May 12 to May 20. I have found a nest and eggs, however, as late as June 18, probably a second laying after losing the first set. Their nests are usually placed in the crotch of a tree, such as basswood, elm, oak, or larch, from 15 to 45 feet from the ground. Occasionally it is placed on a leaning trunk or a large branch, generally in dark woods near lakes. It is a close and compactly built structure, composed of small sticks gathered from the ground near by, no long pieces being used. It is lined with small shreds of bark, but as incubation advances, downy feathers dropped from the breast of the bird become a factor in the lining; a green, leafy twig of basswood or poplar is also added occasionally.

"Their call note is a peevish 'chee-é-é-é' prolonged at pleasure and uttered in a high key. They will sit for hours in high dead trees calling to each other during the breeding season, and they are certain to be heard from should anyone come near the nest. In this locality their food consists mostly of the red squirrel.

"Though usually a sluggish bird, they will at times show considerable courage and dash at an intruder. I have noticed two such instances. Once, while I was in a tree watching a Swallow-tailed Kite, a male Broad-winged Hawk which was guarding a nest fought another bird of this species, driving and pursuing it a great distance. Then suddenly it turned back and almost struck me in the face as it came on with arrow-like swiftness."

Mr. H. H. Brimley, of Raleigh, North Carolina, found a nest of this species, containing two fresh eggs, and sent me an accurate description of it, made before it was removed from the tree. It was taken on April 25, 1890, and is thus described: "It was placed in a small pine in original woods, about 38 feet from the ground. About 6 feet from the top of the tree the main trunk ended in five wide spreading limbs. At the junction of these limbs the nest was built in the crotch. The nest itself was the roughest kind of platform, made entirely of oak sticks, not a single stick of any other kind being used. It was lined with a good sized double handful of pieces of bark from large yellow pines, flat, thin, and smooth scales, not the rougher, thicker bark found on younger trees. This bark lining was 4 or 5 inches deep in the center of the nest; a very few twigs with green leaves of both pine and oak were scattered through the structure apparently accidentally. The bark center of the nest went right down to the limbs of the crotch supporting it. The depth of the depression was more than that in a nest of *Buteo lineatus*, and the whole nest was much rougher and looser than any of those of the latter I have ever seen. No attempt at using any soft lining had been made. While I was up in the tree taking the eggs and making these notes the old birds soaring high above gave vent to notes much like those of the Killdeer."

Mr. J. C. Cairns, of Weaverville, North Carolina, took a set of three eggs of this species on April 25, 1890, and kindly sent me the nest, which was placed in the forks of a large oak tree about 56 feet from the ground. Considering the size of the bird the nest is large and a somewhat loosely built structure. Its outer diameter is 19 by 13 inches; depth, 9 inches; the inner cavity appears to have been shallow and not over 3 inches deep, if so much. It is principally composed of small oak twigs, and among these a few slender pine tips are mixed. The lining consists of thin pieces of pine bark scales. Mr. Cairns says: "In this portion of North Carolina they usually nest on a wooded ridge or at the foot of a mountain, never on or near the top of these, and they return each year to the same localities to breed, nearly always building a new nest each season. Occasionally they make use of an old Crow's nest, or one abandoned by some other Hawk. As a rule they nest in somewhat lower situations than the majority of Raptores, and now and then so low that the nest can be reached from the ground."

Mr. George G. Cantwell, of Lake Mills, Wisconsin, writes me that he found one of their nests in the crotch of a large tree, only 3 feet from the ground. From 25 to 30 feet up is perhaps a fair average.

Besides the different species of trees already mentioned, they nest in maples, poplars, black walnut, beech, chestnut, hemlock, different kinds of pines, oaks, and birches. In the northeastern parts of their breeding range birches, especially the yellow birch, seem to be most often selected for nesting purposes.

Ordinarily the nest is lined only with thin scales of bark, that of the yellow pine perhaps predominating. Sometimes green fir and other leafy twigs and the fine inner bark of the white cedar is added to the lining. Their nests are most often found in the more extensive woods near water and in swamps, and much less frequently in the more open and cultivated sections. The Broad-winged Hawk is only a summer resident north of about latitude 36°, migrating in straggling bodies during September and October to their winter homes in central and northern South America, moving sometimes together in quite large numbers and returning north in March and April.

Their food consists to a great extent of small rodents, such as mice, gophers, and squirrels; shrews, small snakes, frogs, grasshoppers, beetles, larvæ of insects, and very rarely small birds. It is one of the most harmless of our Raptores and of great benefit to the farmer. It is a late breeder; in the more southern portions of its range nidification begins about the second week in April and correspondingly later northward. In the New England States, northern New York, Pennsylvania, Iowa, and Minnesota, generally in the latter half of May, and in New Brunswick and the southern portions of Canada about the beginning of June and sometimes later. Incubation lasts from twenty-one to twenty-five days, and the eggs are deposited at intervals of one or two days. Both parents assist in incubation and in the care of the young. A single brood is raised in a season.

The number of eggs laid by the Broad-winged Hawk is usually two or three, very rarely four. Mr. O. C. Poling informs me, however, that in the vicinity of Quincy, Illinois, sets of four are not especially uncommon, and that he found a nest of this species containing five eggs. These vary considerably both in shape and markings, sometimes even when taken from the same nest.

The average measurement of forty-five specimens I find to be 48.5 by 39 millimetres. The largest eggs, three in number, one from New Jersey, another from New Brunswick, and a third from Pennsylvania, measure each 52 by 40 millimetres. The smallest, from Maine, measures 45 by 38.5 millimetres. In shape they range from short and rounded to elliptical ovate, the greater number being short ovate.

The ground color of the majority of these eggs is dull grayish white; in a few a faint trace of pale gray green is perceptible, and in rare instances this greenish tint is rather pronounced and readily noticed. In some of the eggs faint lavender, pearl gray, or écru-drab shell markings predominate, scattered either in fine dots or irregularly shaped blotches and in variable amounts over

the greater or smaller axis of the egg; or again they may be evenly distributed over its entire surface, relieved here and there by an occasional dark lilac or rich chestnut colored spot. In others, these shell markings are either entirely absent or but faintly perceptible, and the egg is spotted and blotched with different shades of brown, hazel, drab, and fawn color. These markings are usually heaviest on either the large or small end. One specimen in Dr. William L. Ralph's collection is very finely marked with small dots not larger than dust shot, rather evenly distributed over nearly the entire surface, giving it a flea-bitten appearance; occasionally an egg is almost entirely unspotted.

The type specimens selected to show some of the variations are as follows: No. 7271 (Pl. 7, Fig. 13), a single egg collected by Mr. T. B. Richie, near Brookline, Massachusetts, May, 1861; No. 23084 (Pl. 7, Fig. 11), from a set of two taken by Dr. A. K. Fisher, near Sandy Spring, Maryland, May 10, 1887; No. 23272 (Pl. 7, Fig. 10), from a set of two collected by Dr. A. K. Fisher, near Sing Sing, New York, May 24, 1888; and No. 23979 (Pl. 7, Fig. 12), from a set of two taken by Mr. Manly Hardy, near Holden, Maine, May 21, 1890.

## 83. Buteo brachyurus VIEILLOT.

SHORT-TAILED HAWK.

*Buteo brachyurus* VIEILLOT, Nouveau Dictionaire; IV, 1816, 477.
(B —, C —, R —, C —, U 344.)

GEOGRAPHICAL RANGE: Tropical America in general, except West Indies, north to eastern Mexico and Florida.

Within the United States the breeding range of the Short-tailed Hawk, as far as is known at present, is confined to the State of Florida. It can no longer be considered as only an accidental visitor to our southern borders, having been met with in various portions of Florida, and is known to breed there regularly, at least as far north as Tarpon Springs and St. Marks on the Gulf coast. It may be confidently looked for as a rare summer resident throughout that State, and possibly also in the southern portions of the other States bordering on the Gulf of Mexico.

Mr. W. E. D. Scott states: "The observations already recorded * * * and other records here given, lead to the conclusion that this species is of regular occurrence on the Gulf coast of Florida, at least as far north as the vicinity of Tarpon Springs, and that it breeds regularly, though rarely, in this region there can be no doubt. The birds that have been met with in the immediate vicinity of Tarpon Springs have usually been seen in pairs; once three were observed together.

"During March and April, 1888, within a radius of 10 miles of the town in question, there were observed by me on March 17 a single bird, on April 6 a pair, on April 10 a pair, these last two pairs being probably the same individuals. On two other days late in March and April, and several times in

May, 1888, I saw pairs of Hawks that were certainly the same birds. They were always very shy and wary, and difficult to approach in any way. About 200 yards in the open was as near as one could generally approach. They frequented the vicinity of hammocks, and their habits, except the extreme shyness, appeared much like those of the common Red-shouldered Hawk of this region. * * *

"On the 16th of March, 1889, near Tarpon Springs, I found a pair of these Hawks just starting to build a nest. The locality was on the edge of a hammock, and the nest, the foundation of which was finished, was in a gum tree some 40 feet from the ground. Both birds were seen in the act of placing additional material on the structure. As the birds were rare and I could not risk their being killed or driven away, with the aid of a native hunter both were secured, though before killing them I was certain of their identity. * * * The female (No. 6392) of this pair had eggs with the yolks almost developed and would have laid within a week. From the appearance of the ovary and oviduct, I believe that three eggs would have been laid."[1]

Dr. William L. Ralph has also met with this species occasionally in the vicinity of San Mateo, Florida, and informs me that he saw two or three specimens during the spring of 1891. He says: "The native hunters and cattlemen seem to know this bird, and say that it breeds here. They call it the 'Little Black Hawk,' and state that it is more common in the spring and summer than in winter."

Mr. C. J. Pennock, in a short article on the nesting habits of this species at St. Marks, Florida, makes the following statement: "Early in April, 1889, while on a collecting trip at St. Marks, Florida, I spent several days in the swamps that line the Gulf coast. April 3 I noticed a small Black Hawk fly to a nest in a pine tree, about 3 miles from the coast. On climbing to the nest, I found that the tree had formerly been occupied by Herons, there being three old nests besides the one occupied by the Hawk, which I also took for an old Heron's nest. It had evidently been recently repaired, and contained two or three fresh twigs of green cypress on the bottom. At this time there were no eggs, but I again visited the nest April 8. The old bird was seen near, and this time showed some concern, flying around us above the tree tops as we approached, and several times uttering a cry somewhat resembling the scream of the Red-shouldered Hawk, but more shrill and not so prolonged. The nest had received further additions of cypress twigs, but was still empty. My boatman wrote me, May 2, stating that after three visits he had shot the bird on the nest and taken one egg. He skinned her but found no more eggs."[2]

Mr. Pennock has kindly loaned me this egg, and I am thus enabled to figure it. He describes it as dull white, showing blue when held against a strong light. It is spotted on the larger end with reddish brown in small spots and blotches over about one-fourth of the surface. A few finer spots extend to the middle of the smaller end, where, however, they can hardly

[1] Auk, Vol. VI, 1889, No. 3, pp. 243–245. [2] Auk, Vol. VII, 1890, No. 1, pp. 56, 57.

be seen unless closely examined. The egg measures 55 by 41 millimetres, and the ground color is a pale greenish white. The egg is ovate in shape and it is figured on Pl. 8, Fig. 7.

I have been unable to gather any information additional to that already given. From the foregoing it would appear that these Hawks commence laying from the last half of March to the beginning of May, and that from one to three eggs constitute a set.

## 84. Urubitinga anthracina (Lichtenstein).

MEXICAN BLACK HAWK.

*Falco anthracinus* Lichtenstein, Preis-Verzeichniss, 1830, 3.
*Urubitinga anthracina* Lafresnaye, Review Zoölogique, 1848, 241.
(B —, C —, R 444, C 528, U 345.)

Geographical range: Tropical America in general, north to central Arizona, and the Lower Rio Grande Valley in Texas.

As far as is known at present, the breeding range of the Mexican Black Hawk is confined to central and southern Arizona, and the Lower Rio Grande Valley in Texas, and it does not appear to be a common species anywhere within our borders.

While encamped on Rillitto Creek, 7 miles northeast of Tucson, in the spring of 1872, I first noticed this species on April 4, apparently just returning to their summer homes. Knowing but little about our birds I supposed it at first to be one of the dark forms of *Buteo swainsoni*, then known as *Buteo insignatus*, and I subsequently wrongly identified it as *Buteo abbreviatus*. My notes taken on that day read as follows: "Saw a pair of Hawks to-day which I take to be of this species (No. 21, *Buteo insignatus*, Baird's Cat., 1859). They were quite tame, and let me come within 30 feet. I should not exactly call them black, but rather a dark and uniform slate color, with the wings a little darker, possibly. The cere and bill appeared to be yellow, also the feet, and the tail was banded by a white stripe at the end. One of them as it flew off appeared to have every feather of the upper parts of the breast edged with ferruginous. The pair kept circling around and over me, uttering at the same time repeated cries, exact counterfeits of the piping in the spring of *Numenius longirostris*. I could easily have shot both, but they evidently meant to build in the neighborhood."

The ferruginous edgings of the feathers of the breast, noticed by me, clearly indicate that the specimen in question is referable to this species, being a bird still in the immature plumage, and, as far as known, this plumage is not found in *Buteo abbreviatus*.

Col. A. J. Grayson, in his "Notes on the Birds of Northwestern Mexico," says of this species: "Common at all seasons, usually found about the esteros and marshes near the seacoast, subsisting chiefly upon land crabs."

Asst. Surg. Edgar A. Mearns, U. S. Army, published the following account, comprising about all we know as yet about the nesting habits of this species within our borders. He says: "When hunting along a sluice of the Verde River, beneath a dense growth of willows and cottonwoods, I first discovered the Anthracite or Mexican Black Hawk, perched among the thickest foliage of a low willow overhanging the shallow water. The imperfect view obtained as it flew off through the trees led me at first to suppose that it was an immature Golden Eagle, a species that I had several times encountered thereabouts in similar situations. A snap shot proved unsuccessful, as was the case on several subsequent occasions, and, although I frequently saw them along the river, it was long ere I succeeded in procuring a specimen. Always extremely shy, they were usually found hidden in the foliage near the water in some low situation, whence, when surprised, they generally managed to escape through the foliage of the cottonwoods without affording a good opportunity for a shot. Their flight is swift and powerful. Occasionally one was seen eating a fish upon the sandy margin of the river. They were present throughout the summer, but departed in the autumn, my absence in the field during the months of October and November having prevented me from determining the date of departure.

"On the 26th of March, 1885, I found one of these Hawks upon the Agua Fria, about 30 miles southwest of Fort Verde, at a considerably greater altitude; and on Oak Creek, a mountain stream 30 miles north of Fort Verde, in the foothills of the San Francisco Mountains, I wounded an immature example on the 12th of August of the same year, it having probably been reared on that stream, which abounds with trout and other fishes.

"On the 19th of June, 1885, Capt. T. A. Baldwin and I set out to visit Fossil Creek, 30 miles east of Fort Verde, with an escort of two soldiers. We carried some rations and mining implements packed upon a mule and two burros. We found the trail to the cañon without difficulty, but when nearly at the bottom took the wrong fork of the trail, which finally led us to the spring and forks of Fossil Creek, both branches of which we explored for several miles, finding tracks of wolves, bears, deer, raccoons, and beavers. A pair of Mexican Black Hawks were found at the forks of the stream close to the place where we had pitched our camp. Their loudly whistled cry is different from that of any bird of prey with which I am acquainted, and is difficult to describe, although rendered with great power.

"They circled about us a few times, then retreated to some tall piñons upon the hillside, where they continued to cry vehemently until I essayed to force my way through the thick scrub oak towards them, when both birds flew with loud screams to a tall pine tree down the stream, where I succeeded in obtaining a long shot at the male bird, which, although mortally wounded, flew beyond my reach before dropping to the ground. His mate flew to the piñons far up the steep banks of the cañon, out of reach, and continued screaming, following me up the cañon. Towards nightfall I came

up with Captain Baldwin, and he told me that he had discovered the nest of my *rara avis* in a tall cottonwood down the cañon, and said if we hastened we might procure the eggs before dark and secure the other parent.

"The nest was built in a cottonwood tree in the same grove in which we first found the birds. The nest had evidently been the birthplace of many generations of these Hawks, for it measured 4 feet in depth by 2 feet in width. It was lined with a layer of cottonwood leaves several inches deep, was very slightly concave, and composed of large sticks, much decayed below, showing that they had been in position for a number of years. The nest was about 30 feet from the ground. The female parent remained too shy to return to the nest until I began to climb the tree. At first I attempted to ascend by means of some grapevines, which gave way; then I managed to reach the upper part of the huge bole by swinging from a tall, slender box-elder tree, and scrambled with much exertion to the lowest branch. Meanwhile the Hawk had shown much uneasiness, fluttering in the air and screaming lustily. As I approached her treasure her parental solicitude overcame her terror, and she sailed over the tree top. I saw the gun at the captain's shoulder and feared he would miss; but he wisely held his fire until the bird wheeled and rushed directly toward me, when a well-directed shot dropped her just at his feet. A minute later I reached the nest and discovered a single half-grown nestling, having the quill feathers webbed terminally, and leaden gray down covering the greater part of the body. It fought fiercely and evinced great pluck and ability to defend itself. The wounded parent was also savage, and tried to reach its assailant. After it was dispatched the captain proposed that we should attempt to find my wounded Hawk; but the locality was too dangerous, so we abandoned it with regret."[1]

On May 20, 1887, the doctor found a nest and two eggs of this species on Beaver Creek, 6 miles northeast of Fort Verde, in central Arizona. The eggs had been incubated when found, and are now in the American Museum of Natural History, New York City. One of these is figured.

Mr. D. B. Burrows writes me that he found a nest of this species in Starr County, Texas, on April 25, 1891, containing a single egg. The female was shot from the nest, and dissection showed that no more eggs would have been laid. The nest, a newly constructed one, was placed in a dense willow grove in the main forks of a tree of this species, about 30 feet above the ground, and growing about 80 yards from the banks of the Rio Grande. It was about 15 inches wide by 8 inches deep and rather shallow. It was composed of dry twigs and was well lined with green willow leaves.

Mr. Burrows describes the egg as ovate in shape, the ground color as dull white, with a faint greenish tinge, and as marked over the entire surface with small and irregular blotches, varying from reddish brown to burnt umber, with a few spots of purplish drab. The markings are heaviest near the larger end,

[1]Auk, Vol. III, January, 1886, pp. 71–73.

where some of them are drawn out into irregular lines. The egg measures 61.5 by 47 millimetres.

An egg sent by Lieut. H. C. Benson, Fourth Cavalry, U. S. Army, from near Fort Huachuca, Arizona, identified as that of *Buteo abbreviatus*, and so described by me in the Proceedings of the U. S. National Museum (Vol. x, 1887, pp. 551–552), is, according to our present knowledge of the eggs of these two birds, much more likely to belong to the Mexican Black than to the Zone-tailed Hawk, and although not absolutely certain of this, I figure it under this species, especially as it is somewhat different from any Hawk's egg in the U. S. National Museum collection. This nest was found May 6, 1886, in a sycamore tree, in a deep arroyo near the base of the Huachuca Mountains. The nest was a large and bulky one, and lined with a few leaves only. It contained but a single egg, which was slightly incubated. This is ovate in shape, has a ground color of pale greenish white, and is sparingly spotted and blotched, with small irregular markings, lines, and tracings, varying in color from burnt umber to tawny olive. It measures 59.5 by 46.5 millimetres. It is No. 22930, U. S. National Museum collection, and is figured on Pl. 8, Fig. 9.

The Mexican Black Hawk is only a summer resident along the southwestern border of the United States, and nowhere common. Nidification begins in the southern part of Arizona in the latter part of April, and a little later northward. But a single brood is raised in a season, and one or two eggs constitute a set.

A fully identified egg of this species, taken by Dr. Mearns, on May 20, 1887, and already referred to, now in the collection of the American Museum of Natural History, is oval in shape, dull white in color, and irregularly blotched, principally about the larger end, with small markings of different shades of brown. This egg measures 56.5 by 46 millimetres, and is figured on Pl. 8, Fig. 8.

## 85. Asturina plagiata Schlegel.

MEXICAN GOSHAWK.

*Asturina plagiata* (Lichtenstein) Schlegel, Musé de Pays Bas. Asturinæ, 1862, 1. (B 33, C 358, R 445, C 527, U 346.)

Geographical range: Middle America, south to Panama; north to southern border of United States, in southern New Mexico and Arizona.

As far as known at present, the breeding range of the Mexican Goshawk includes that portion of Arizona south of the Gila River and southern New Mexico (Fort Bayard), and it is only a summer visitor within the limits of the United States, arriving in the vicinity of its breeding grounds early in March, and in late seasons not until the beginning of April. As it is known to breed in the province of Tamaulipas, Mexico, close to our southern border, it will probably yet be found nesting along the Lower Rio Grande Valley in Texas as well.

The first pair of these birds seen by me were circling high in the air above the timber in the Rillitto Creek bottom near Tucson, Arizona, on April 9, 1872. After sailing around for sometime, they finally perched on a dead limb of a cottonwood. During the next week I noticed several other pairs and watched them carefully in order to locate their nesting sites; they were not at all shy, and, had I been so inclined, could have secured a number of specimens with but little trouble. From that time on not a day passed without my seeing two or three pairs of these handsome little Goshawks (which were readily recognized by their light color) engaged in sailing gracefully over the tree tops, now sportively chasing each other, or again circling around, the female closely followed by the male, uttering at the same time a very peculiar piping note, which reminded me of that given by the Long-billed Curlew in the early spring (while hovering in the air in the manner of a Sparrow Hawk), rather than the shrill cries or screams usually uttered by birds of prey. To my ear, there was something decidedly flute-like about these notes. After they were paired they became more silent.

When in search of food their flight is powerful, active, and easily controlled. I have seen one of them dart to the ground with arrow-like swiftness to pick up some bird, lizard, or rodent, continuing its flight without any stop whatever. A good proportion of their food consists of beetles, large grasshoppers (a species of which about 3 inches long was especially abundant), and other insects; these are mostly caught on the wing, and I believe small birds also form no inconsiderable portion of their food, as I have seen them chasing such.

Mr. F. Stephens compares their cry to a loud "creer," repeated four or five times, and says that at a distance it sounds much like the scream of a peacock. The stomachs of the specimens examined by him contained lizards, small squirrels, fish scales, the wing covers of beetles, and fur and bones of small unrecognizable rodents.

About the last week in April several pairs had selected their nesting sites within a radius of 10 miles from my camp, and commenced building. All the nests found by me, four in number, were placed in cottonwood trees, usually the largest to be found in the vicinity, and as near their tops as they could be placed with security.

The first nest was obtained on May 17, and the male, who was sitting on a limb close by, was shot. This nest was located in the topmost branches of a large cottonwood tree near the laguna, the sink of the Santa Cruz River, not less than 70 feet from the ground, and contained three fresh eggs, the only set I found which contained this number. The nest, not a very substantial affair, consisted of a shallow platform, composed principally of small cottonwood twigs, a number of which were green and had been broken by the birds themselves. I have seen them do this, selecting a suitable twig, then flying at it very swiftly, grasping it with their talons, and usually succeeding in breaking it off at the first trial.

Many of these twigs had the leaves attached to them and only partly dried. The inner lining of the nest consisted of dry cottonwood leaves and the tops of willows, the latter also taken while green. No bark nor material other than that mentioned was used in the construction of this nest.

A second one, found June 6, 1872, contained but two eggs, on which the bird had been sitting for about a week. This was in a similar situation to the first, and resembled it in structure, but was lined with a few strips of the soft, dry inner bark of the cottonwood and with dry leaves of the same tree. A third egg was taken from this nest June 18, but whether laid by the same bird or not, I am unable to tell.

On June 19 I took another set of two eggs, which contained small embryos. The nest, like the first one, was composed principally of small green twigs, many with the leaves still on them, and lined with green willow tops. The last nest was found on June 20, within a mile of my camp, and though positive that a pair had a nest somewhere in this grove—a rather dense one—I failed to locate it, although I had, as I supposed, carefully examined this very tree several times previously. I also saw the birds about, but the nest was so well hidden among the dense foliage of the top that only a small portion was visible from below, and this only from a certain point of view. It contained two eggs with good-sized embryos, and the lining consisted of partly dried cottonwood leaves.

The nests are rather frail structures, and were all apparently newly built. They were shallow and but slightly hollowed, not more than 1½ inches deep. The last two found were very difficult to get at, resting as they did on very slender limbs, and from the fact that they were composed principally of green twigs it was no easy matter to detect them. The birds made but little demonstration when the eggs were taken, beyond circling above the tree tops and uttering a few shrill screams. I believe that but one brood is reared in a season. The male assists in getting the nesting material and perhaps in incubation as well. By the latter part of October most of them had departed for their winter homes.

Mr. F. Stephens has also found their nests in Arizona and southern New Mexico, and considers them as common about Tucson, especially in some of the large mesquite groves on the Santa Cruz River. He found them nesting between May 2 and June 2, usually finding two eggs to a set. The nests were placed in cottonwoods and large mesquite trees.

I consider this one of the handsomest Hawks we have; graceful and quick in all its movements, a swift flyer, and resembling the Goshawk in many respects, but it prefers more open country than the latter. It seems to be found only in the vicinity of water courses, and not, like many of the other Raptores, on the dry and comparatively barren desert-like plains. It nests later than most Hawks found in Arizona, usually during May, and even as late as the middle of June.

Mr. Otho C. Poling writes me from Fort Huachuca, Arizona, regarding this Hawk, as follows: "I first met with this species on March 3, 1890, when a male was shot in a deep wooded cañon in this vicinity, at an elevation of about 7,000 feet. It had a squirrel in its talons about two-thirds eaten. During the month of June, 1890, I was camped in a cañon of the Huachuca Mountains, among some thick spruce and sycamore woods, and had not been long in camp when I heard a faint squeaking noise overhead, and on investigating, found a nest of young Raptores in the top of a high sycamore, directly in front of my tent. To my great pleasure I found, on waiting for the parent to arrive, that it was the Mexican Goshawk. She made half a dozen or more trips daily to the nest, and whenever she arrived her presence was at once hailed by the hungry nestlings. I watched her closely; she would make daily trips to the mesquite plains for cotton tails (*Lepus arizonæ*), some 6 or 8 miles out in the valley. After the first week a neighbor came to my camp and during my absence shot the female, and presented it to me on my return.

"Up to this time I had not seen the male, or at least had seen only one individual at a time, but noticed on the following day that another bird, evidently the male, appeared and carried on the feeding of the family as regularly as if nothing had happened. The young were now growing rapidly, and their cries were much louder while being fed. One day, on glancing up at the nest, I saw one of them perched upon a limb beside it. The parent bird was near by with some game, and seemed to be urging the young one to fly to it, if it would have its meal. Although it demanded its regular allowance loudly, I observed it was left out of reach by the old bird until its first lesson of flying was learned. The young were three in number, and all were out of the nest the following day, but returned to it at night. They remained about for several days and finally disappeared."

Incubation lasts from three to four weeks. The eggs are usually two in number, seldom more; about one set in four contains three eggs. Their ground color is a pale bluish white; and all the eggs I have taken, with a single exception, are unspotted, but always more or less stained with yellowish, which is difficult to remove. These stains are probably caused by the green leaves on which the eggs are usually laid. The shell is fairly smooth, close grained, slightly pitted, and without luster. In two sets of eggs of this species taken by Mr. F. Stephens, near Fort Bayard, New Mexico, both found on April 23, 1876, and which are now in the collection of the American Museum of Natural History, in New York City, one egg in each is marked with a few buffy brown spots about its larger end. These, although few, are readily noticeable, while the markings on the specimen taken by myself are scarcely perceptible to the naked eye. Only a single brood is raised in a season. The eggs vary considerably in shape, the majority are a perfect oval, a few are elongate ovate, and one may be called ovate pyriform.

The average measurement of the eggs of the Mexican Goshawk in the U. S. National Museum collection is 51 by 41 millimetres, the largest egg measuring 54 by 40, the smallest 48 by 41 millimetres.

The type specimen, No. 16525 (Pl. 7, Fig. 7), U. S. National Museum collection, from a set of two, Bendire collection, was taken by the writer on June 6, 1872, on Rillitto Creek, near Tucson, Arizona.

## 86. Archibuteo lagopus (Brünnich).

ROUGH-LEGGED HAWK.

*Falco lagopus* Brünnich, Ornithologia Borealis, 1764, 4.
*Archibuteo lagopus* Gray, List Genera of Birds, ed. 2, 1841, 3.
(B —, C —, R —, C —, U 347.)

Geographical range: Northern parts of the Old World; (Alaska?)

The Rough-legged Buzzard has been included in the "A. O. U. Code and Check-list of N. A. Birds," based on specimens from Alaska, but Mr. Robert Ridgway, in his "Manual of North American Birds, 1887," p. 240, in a foot-note on this species, writes as follows: "So far as evidence to date tends to show, the typical form of this species, if a distinctly American race be recognized, must be expunged from the 'List of North American Birds.'"

According to Mr. H. Seebohm, "the true home of the Rough-legged Buzzard Eagle is in the northern portions of the European and Asiatic continents. It breeds throughout Arctic Europe and Asia, being a very common species in Norway and Sweden, up to the North Cape, becoming rarer in Russia, yet more plentiful in Siberia, where it ranges as far to the east as the watershed of the Yenesay and Lena. In the winter it retires southward to various parts of central and southern Europe and the steppes of Russian Turkestan."[1]

Mr. Harvie Brown found it breeding in south Norway in 1871, the nests usually being placed in clefts of more or less inaccessible rocks. In Lapland, according to Wolley, they often breed in firs. The number of eggs vary from three to five. The nests are large, composed of sticks and lined with grasses; when placed on cliffs, sticks are frequently dispensed with, and it consists of a slight hollow lined with grasses. In its general habits it resembles our American Rough-legged Hawk in every respect, and the differences in plumage are but very slight in the majority of specimens.

According to Mr. Seebohm, the eggs vary greatly in size and markings, some being poorly marked while others are very richly blotched with dark red, or clouded and mottled with pale brown. In some eggs the coloring is confined to a few large rich blotches of red, others are evenly spotted with color just as intense over the entire surface. A more uncommon variety is delicately streaked and penciled with a few irregular dashes of pale brown, something like the egg of a Kite. Other varieties are seen in which all the coloring is distributed in pale purplish shell markings, with perhaps a few streaks of rich brown. They vary from 2.25 by 2.1 inches in length, and from 1.8 to 1.65 inches in breadth (equal to 57.15 to 53.34 millimetres in length and 45.72 to 41.91 millimetres in breadth).

[1] History of British Birds, Seebohm, 1883, Vol. I, pp. 111–115.

There seems to be no difference whatever in the eggs of this species and our own, and none are figured for that reason. Ten eggs in the U. S. National Museum collection from Lapland average 57 by 44.5 millimetres, the largest measuring 60 by 46, the smallest 53 by 43.5 millimetres.

## 87. Archibuteo lagopus sancti-johannis (Gmelin).

AMERICAN ROUGH-LEGGED HAWK.

*Falco sancti-johannis* Gmelin, Systema Naturæ, I, ii, 1788, 273.
*Archibuteo lagopus* var. *sancti-johannis* Ridgway, in Coues's Key to North American Birds, 1872, 218.

(B 30, 31, C 356, R 447, C 525, U 347*a*.)

Geographical range: Whole of North America.

Excepting the Territory of Alaska, the American Rough-legged Hawk does not breed within the United States, the various records to the contrary notwithstanding. Not a single one of these is absolutely unquestionable. Its most southern breeding range, so far as I am able to learn, is perhaps that given by Dr. C. Hart Merriam, based upon the observations of Mr. Napoleon A. Comeau, made in the vicinity of Point de Monts, province of Quebec, Canada, in about latitude 49°, who states that it is rather common, and breeds there.[1] It is questionable if it breeds anywhere south of the river St. Lawrence, and if it does such instances must be of rare occurrence.

Mr. L. M. Turner, of the U. S. Signal Service, found it breeding abundantly in southern Labrador and at Fort Chimo, Ungava Bay, while stationed at the latter point, and he considers it one of the most common of all the birds of prey in that region.

In the interior it is said to be not uncommon, and to have been found breeding on the Saskatchewan plains, in the similarly named district, about latitude 53°. It is most common, however, from the Anderson River and Rendezvous Lake country up to the Arctic coast, where that indefatigable naturalist and explorer, Mr. R. MacFarlane, of the Hudson Bay Company, took not less than fifty-eight nests with eggs while traveling through this scarcely known and ice-bound wilderness nearly thirty years ago. Quite a fine series of the eggs of this species collected by this gentleman are in the U. S. National Museum collection.

On the west coast it is not uncommon during the breeding season in the vicinity of Fort Yukon, Alaska, as several sets of eggs taken there attest. Mr. E. W. Nelson, of the U. S. Signal Service, took their eggs at Saint Michael; and Mr. C. L. MacKay on the Nushagak River, Alaska; but it appears to be rarer near the coast there than in the interior. It probably breeds in the northern portions of British Columbia as well, but I find no reliable records from there.

[1] Bulletin Nuttall, Ornithological Club, Vol. VII, 1882, p. 237.

In the United States it is only met with as a migrant, arriving regularly from its breeding grounds in the far north in the fall and returning early in the spring. It winters chiefly in the middle and more open prairie States, not being partial to heavily timbered regions. In the East it is generally found along the flat, open country adjacent to the coast and the larger rivers, avoiding the mountainous and heavily wooded districts of the interior.

Although a large and powerful bird, it is of a peaceful disposition, and its food is humble, consisting principally of meadow mice and small rodents. It is doubtful if it ever catches a bird, its flight usually being slow, deliberate, and apparently laborious.

I found this species very abundant during the fall on the Umatilla Indian Reservation, and in the Harney Valley, Oregon, where they principally feed on small rodents and grasshoppers and occasionally on rabbits. I have often seen a dozen or two in a few hours' ride, usually standing singly on a little hillock on the open prairie, or perched upon a sage bush watching for prey. They are a perfectly harmless bird and deserve to be fully protected. When mounted they allowed me to approach closely, but when on foot they kept well out of range.

Mr. L. M. Turner, in his "Notes on the Birds of Labrador and Ungava," says: "The American Rough-legged Hawks arrive here, at Fort Chimo, about the last week in May and remain until the first week in October. Immediately on their arrival a site is secured for a nest, as mating has evidently occurred before they appear in this vicinity. Oftentimes the same place is resorted to, where the same pair have reared their young for many seasons. All the nests discovered by me were placed on a ledge or projection of a high bluff. Should there be several ledges, apparently suitable in all respects on the same bluff, the one nearest the top is selected. I surmise this is done in order to allow the birds a greater view of the surrounding country for the purposes of searching for food and to avoid danger.

"The nest is composed of sticks of various sizes, together with a few grass or weed stalks placed irregularly crosswise. The particular location of the nest modifies the amount of material used. A flat rock usually has but sufficient of these materials to prevent the eggs from rolling about. Where the place slopes the nest is usually higher in front, and often with nothing at the rear portion of it except the side of the cliff. In locations where the nest has been used for several years the amount of material accumulated is astonishing. I have seen several nests which would form a good load for a wheelbarrow. It often occurs that the nest material is increased considerably each year, and other nests appear to have been only rearranged. The depression containing the eggs is quite shallow and in some instances nearly flat. The accumulations around the nest, such as refuse food, is also surprising in quantity, and when this decomposes forms a soil in which grow grasses and other plants, which, from the character of the soil and favorable position (rarely to the northward), often attain a most luxurious growth and

thus indicate the site of a nest which otherwise might have been overlooked. * * * The parent birds usually denote the proximity of a nest by sailing high in the air over the locality. Occasionally a nest may be discovered in an unexpected location. I found one, some 3 or 4 miles from the mouth of the Kotsoak River, on a grassy ledge, near the top of the side of a short but deep ravine. The nest was easily approached from the top without other labor than that of walking down to it. The positions of nests of various birds of prey were often a matter of wonder to me how they escaped the ravages of foxes and other prowlers. * * * At other times the nest is placed in a most inaccessible spot. I thought these were probably the nests of birds which may have been more persecuted than others and had not profited by experience. At no time did I observe anything like fierceness exhibited by these birds, either when wounded or when their nest was approached. The male can seldom be secured near the nest, while the female is sometimes heedless of distance, although rarely approaching very near."

In regard to the nesting sites most frequently made use of in the Fur Country, Mr. R. MacFarlane's experience was quite different, showing that the nesting habits of this, as well as of many other species, differ greatly in places, the birds adapting themselves to the immediate surroundings. Out of the fifty-eight nests found by him, forty-six were placed in trees, usually pines, and at an average height of about 20 feet from the ground. The remaining twelve were built on the edges of steep cliffs of shaly mud, on the banks of creeks, rivers, or lakes. Such nests as were found in trees were usually placed in a crotch not far from the top, composed of sticks and warmly lined with dry grasses, down, and feathers. Those on cliffs were similarly constructed, but usually with a smaller base of sticks and better lined.

The eggs vary from two to five in number, usually three or four, and are deposited at intervals of two or three days, and were often found in different stages of incubation. With but few exceptions, most of Mr. R. MacFarlane's specimens were found during the month of June. The earliest date on which he took eggs of this species, according to the records here, was on May 23. Mr. L. M. Turner took a set on May 24, evidently not complete, and the remainder in June. The middle of June seems to be the proper time to look for full sets.

Incubation lasts about four weeks, and by the middle of July most of the young are hatched and they leave the nest about the beginning of September. According to Mr. Turner, the young appear to be able to take care of themselves as soon as they leave the nest. He says the Eskimo apply the name of "Kin-wi-yuk" (in imitation of its notes) to this species, and that the people of Labrador term it the "Squalling Hawk," from the noise it makes when alarmed.

But one brood is raised in a season. The eggs of the American Rough-legged Hawk vary greatly in size as well as in shape. Some are ovate,

many short ovate, and others rounded ovate. The ground color in the more recently collected specimens is a pale greenish white, which appears to fade out in time, leaving the egg a dull dingy white. The shell is close grained and strong. There is an endless variety in the markings, both in regard to size and amount, in different specimens. In some they are fairly regular in shape as well as size, in others exactly the reverse. In some they are well defined, evenly colored throughout; in others quite clouded and of different tints. A few specimens are streaked and the markings run longitudinally from end to end. The spots and blotches consist of various shades of brown, the predominating tints being burnt umber and claret brown, and among these are mixed lighter shades of ochraceous, clay, fawn color, and écru-drab. Quite a number of specimens show also handsome shell markings of a rich heliotrope purple and pale lavender, mixed in and partly overlaid with darker tints. In many eggs the blotches are large and irregular in outline, and usually heaviest on the large end, but in no case do they hide the ground color. Others are regularly and sparingly marked over the entire egg, with fine dots of different shades of brown and lavender, giving the egg a flea-bitten appearance. While some eggs are but slightly marked, none are entirely unspotted. To sum it up in a few words, they show a great variety of styles. Compared with the eggs of other Raptores, they perhaps resemble those of *Buteo lineatus* in coloration more than any other species.

The average measurement of sixty-three specimens in the U. S. National Museum collection is 56.5 by 45 millimetres. The largest egg of the series measures 62 by 47, the smallest 51 by 41.5, and a runt egg but 42.5 by 38 millimetres.

The type specimens selected to show some of the different styles of markings are No. 8818 (Pl. 8, Fig. 10), from a set of two, taken May 23, 1863, on the Anderson River, Arctic North America, by Mr. R. MacFarlane, of the Hudson Bay Company; No. 8831 (Pl. 8, Fig. 11), from a set of three, taken June 16, 1863, on the same river and by the same collector, and No. 22393 (Pl. 8, Fig. 12), from a set of three, taken June 10, 1883, by Mr. L. M. Turner, U. S. Signal Service, near Fort Chimo, Labrador.

## 88. Archibuteo ferrugineus (Lichtenstein).

FERRUGINOUS ROUGH-LEG.

*Falco ferrugineus* Lichtenstein, Abhandlungen der Koeniglichen Akademie Berlin, 1838, 428.

*Archibuteo ferrugineus* Gray, Genera of Birds, fol. ed., 1849, 12.

(B 32, C 357, R 448, C 526, U 348.)

Geographical range: Western United States; east to and across the Great Plains (occasionally to Illinois); north to Saskatchewan; south into Mexico.

The Ferruginous Rough-leg, a large and handsome species, is an inhabitant of the open prairie country of the West, and breeds in suitable localities from eastern Colorado and Wyoming, northern Utah, central and western

Kansas and Nebraska, northward through the Dakotas and eastern Montana, passing beyond our border through Manitoba to the Saskatchewan plains in about latitude 55°. It possibly breeds very rarely in northwestern Texas, and has been reported as nesting near Grinnell, Iowa, but this record is not fully verified.

Dr. Elliott Coues records it as common and resident at Fort Whipple, Arizona, and on the Pacific coast it has frequently been taken in California, but does not seem to breed there, and I have personally obtained it in the vicinity of Walla Walla, Washington, in 1880–1882, apparently migrating southward, and I believe it nests occasionally in that vicinity, as well as farther north. It is seldom met with east of the Mississippi River, and does not seem to breed in Minnesota, as far as known at present. In the northern portions of its range it is a summer resident, wintering abundantly in western Texas, and many passing south into Mexico.

This handsome Hawk, easily recognized by its large size, pale ashy-colored tail, and generally light colored underparts, strongly contrasting with its rufous legs, seems to be essentially a prairie bird, and while not particularly common anywhere, is perhaps more so on the extensive prairies of the Dakotas than anywhere else within our limits. In the early days, when California was not as thickly settled as it is now, the Ferruginous Rough-leg, or the California Squirrel Hawk, as it was then called, was not uncommon on the extensive Tularé Plains, as well as in the vicinity of Los Angeles, but in more recent years it seems to have been but rarely noticed in these regions. I have observed it in northern Nevada, southern Oregon, and Washington, where it is by no means common. In the northern part of the latter State, I believe, it is a summer resident, shunning the settled regions, and probably breeding on the extensive dry plain in the great bend of the Columbia River, and the Okinakane Valley, north of this stream. I have also met with it in southern Arizona in winter, and it may possibly breed there in small numbers.

Its flight is rather slow, but graceful nevertheless; it seems to take life easy and to be but seldom in a hurry. Its food, like that of the Rough-legged Hawk, consists principally of rodents of different species abounding in the prairie regions which it inhabits.

My friend Capt. B. F. Goss writes me as follows: "The Ferruginous Rough-leg is not uncommon in the high broken prairie and lake regions of northwestern North Dakota. In May, 1880, I took four sets of their eggs, the nests being all placed on the ground, on rocky hillsides, generally near large bowlders. They were constructed of bones, turf, and dry grasses, usually quite bulky and rather poorly finished. Bleached buffalo skeletons were scattered over the country in considerable numbers, and the ribs of these had principally been used by these Hawks for the groundwork of their nests. While traveling over the country, I had several times seen circles of these ribs, lying on the ground, all pointing toward the center like the spokes of a wheel, and I wondered at their regular arrangement. The find-

ing of these nests solved the mystery; the annual prairie fires had burned the rest of the nest, and left the bones as placed by the bird. Three of the sets found contained three eggs each, the other one four. From reliable information received, I think sets of four eggs are common with this species. Some of these nests, besides being lined with weed stalks and dry grasses, contained also small pieces of dry turf, which the birds must have pulled or dug up with a great deal of labor, as the sod was very tough. The buffalo ribs were used in lieu of sticks, there being no timber of any consequence in the Coteau Hills, where I found them breeding, within a distance of 15 miles. The only trees of any size in that country are found along the borders of the large streams. The settlers call this bird the Eagle Hawk; they were so very wild, I could not get within rifle shot of them in the open, and it was only by hiding in a washout that we were able to get specimens for identification."

In eastern Colorado, and in other localities as well, the Ferruginous Rough-leg builds in trees, where such are available. Mr. F. M. Dille, of Greeley, Colorado, found one of their nets on Lone Creek, and describes it as follows: "When we located our ranch on this creek, we noticed in a cottonwood tree about 100 yards from the tent an immense nest, and in a few days a large pair of these Hawks took possession. They did not mind our presence at all, and, with the aid of a good field glass, I watched the pair pretty closely. The nest was lined with immense tufts of dry grass, roots and all, and an egg was laid on Monday, April 13. The male bird never visited the nest after this, but would sit out upon the prairie catching gophers, etc., which were turned over to the female. I visited it again while they were away, on Tuesday, and found three or four gopher heads and tails in it, but no more eggs. This egg resembled a Fish Hawk's egg very much, having a light blue background with a rich rufous brown and chocolate markings, blotched all over, and measured 2.50 by 1.95 inches (equal to 63.5 by 49.5 millimetres). Another egg was laid on Wednesday afternoon, and this was considerably lighter and less marked than the first. What blotches it had were gathered around the smaller end, and ran back in long lines.

"These birds did not attempt to drive me off while I was up the tree, and I waited till Monday, the 20th, for another egg, but thinking that the set was complete, and wishing to obtain fresh eggs, I took the set on the afternoon of the 20th.

"I thought at first that the bird was a Fish Hawk, so I shot the female in order to make sure. In the bird's fall a large egg about to be laid was broken, the shell of which was clear sky blue, and there were ten or twelve distinct eggs of all sizes in the Hawk, three of them quite large. The nest was composed of dry limbs and sticks, some as large as broomsticks. It was 3 feet in diameter and about 2 feet deep, situated about 12 feet from the ground."[1]

[1] Young Oölogist, 1885, pp. 44, 45.

This species has also been found breeding in northern Utah by Mr. C. S. McCarthy, while attached as naturalist to Capt. J. H. Simpson's exploring expedition, and the parents as well as the eggs are now in the U. S. National Museum collection. The nest was found in Rush Valley, on May 3, 1859, and was placed in a cedar tree 15 feet from the ground; it contained four eggs.

The first eggs of the Ferruginous Rough-leg brought to scientific notice are a set of four, taken by Capt. T. Blakiston, on April 30, 1858, and one of these is figured. The nest was placed in an aspen tree 20 feet from the ground, and was composed of sticks, lined with buffalo wool. It was a large, bulky affair, measuring 2½ feet across. It was found between the north and south branches of the Saskatchewan River, Manitoba. Another set of eggs, taken in the same locality, five in number, came from a nest only 10 feet from the ground. None of the eggs of this set are in the U. S. National Museum collection.

Probably but one brood is raised in a season; the eggs, from two to five in number, usually three or four, are deposited about April 15 in the more southern portions of its range, and from two to four weeks later farther northward. Nesting sites seem to be as often selected on the ground as in trees, and if in the latter they are frequently quite near the ground. Incubation, as with most of the large Hawks, probably lasts about four weeks. The eggs are laid at intervals of two or three days. They are large and among the handsomest of those of the Raptores, and in shape usually ovate, seldom elliptical ovate. The shell is close grained and compact, dull creamy or pale greenish white in color, irregularly blotched and spotted with various shades of brown, and a few pale lilac and lavender shell markings. In some specimens the darker markings predominate, and in others the reverse is the case. An occasional egg is almost unmarked, and the larger sets usually contain one or two eggs much less marked than the others, and sometimes almost entirely unspotted.

The average measurement of fifteen specimens in the U. S. National Museum collection is 63.5 by 49 millimetres. The largest egg of the series measures 66 by 50.5, the smallest 61 by 48 millimetres.

Of the type specimens, No. 2662 (Pl. 9, Fig. 2), selected from a set of four, was collected by Capt. T. Blakiston, April 30, 1858, on the Saskatchewan plains, British North America; the other two eggs, both from the same set, No. 22717 (Pl. 9, Figs. 1 and 4), were collected by Capt. B. F. Goss in the Coteau Hills, North Dakota, May 12, 1880, and obtained in exchange. They show the different styles of coloration often found in eggs of the same set.

## 89. Aquila chrysaëtos (Linnæus).

GOLDEN EAGLE.

*Falco chrysaëtos* Linnæus, Systema Naturæ, ed. 10, I, 1758, 88.
*Aquila chrysaëtus* Dumont, Dictionaire Sciences Naturelle, I, 1816, 339.
(B 39, C 361, R 449, C 532, U 349.)

Geographical range: Northern portions of northern hemisphere, chiefly in mountainous regions.

It is questionable if at the present day the Golden Eagle breeds to any extent within the more thickly settled portions of the United States east of the Mississippi River. An isolated pair, here and there, may perhaps still be found in the wildest mountain regions of the New England States, the Adirondacks of northern New York, the mountains of the two Virginias, Kentucky, Tennessee, northern Georgia, and North Carolina. In the last mentioned State they are to-day far more likely to be found than in the other localities. It probably occurs in Minnesota. In the West this bird, while nowhere especially common, seems nevertheless to be pretty generally distributed from northwestern Texas, through New Mexico, Arizona, and California, northward to the Arctic Ocean. In the interior Rocky Mountain region it is fairly common; while in portions of California it may be called common, and it is likewise so in Alaska and the adjacent islands. In the eastern part of its range, as well as in the Rocky Mountains and the neighboring ranges on either side, the Golden Eagle resorts almost exclusively to the most inaccessible cliffs for the purpose of nidification. In the extensive prairie regions of the West, where there are no such localities to be found, steep perpendicular bluffs on the banks of streams, and occasionally trees, are utilized. This appears also to be the case in the fur countries in British North America, where Mr. R. MacFarlane took a number of their nests in such situations. On the Pacific coast, especially in California and Oregon, trees seem to be the favorite sites; usually large pines or oaks are preferred to high cliffs, which in many instances are available, in close proximity to the trees. This applies more particularly to the Blue Mountain region of Oregon, Washington, and Idaho, where I have personally observed such to be the fact.

Notwithstanding the many sensational stories of the fierceness and prowess of the Golden Eagle, especially in the defense of its eyrie, from my own observations I must confess that if not an arrant coward, it certainly is the most indifferent bird, in respect to the care of its eggs and young, I have ever seen. This may possibly be due more to utter parental indifference than to actual cowardice, as three of these birds, an adult male caught in a trap, and a pair of young, male and female, taken from the nest when about three weeks old and raised by me, did not seem to be deficient in spirit, by any means, and were always ready to attack anything and everything, on the slightest provocation.

The Golden or "Mountain" Eagle, as it is frequently called in the West, is a clean, trim-looking, handsome bird, keen-sighted, rather shy and wary at all times, even in thinly settled parts of the country, swift of flight, strong and powerful in body, and more than a match for any animal of similar size. In the West, where food is still plenty, their bill of fare is quite varied. This, I am informed, includes occasionally young fawns of antelope and deer, but more frequently small mammals of different kinds, as the yellow-bellied marmot, prairie dogs, hares, wood rats, squirrels, and smaller rodents, waterfowl, from Wild Geese to the smaller Ducks and Waders, Grouse, and Sage Fowl. On the extensive sheep ranges in the West, they are said to be occasionally quite destructive to young lambs.

Capt. Platt M. Thorne, Twenty-second Infantry, U. S. Army, writes me: "On December 10, I saw a Golden Eagle brought in by an Indian who had shot it about 20 miles south of Fort Keogh, Montana. He told me, 'I had badly crippled a black-tailed deer just before dark, and as soon as it was light the next morning I started to look for it. I saw this bird hovering pretty high up, and all at once drop down like a stone, and I heard the deer bleat. I was not far off and saw that it had struck its talons in the deer's flanks, and seemed to force it to the ground. As soon as the deer was down it changed its hold to the throat. Judging by its motions it was choking and tearing it. When I got close up, the deer was dead, and the bird stood on the ground with head stretched out, wings extended, the tips touching the ground. It seemed ready to spring if the deer moved. It appeared to have little fear of me and acted as if it meant to fight.' Of course I cannot vouch for this story, but I know the Indian well and have no reason to doubt it."

Birds are usually well plucked, but the smaller mammals are eaten hair and all. They are exceedingly cleanly at all times, and bathe frequently; mine took their bath daily, as soon as fresh water was given them, but while apparently fond of this for bathing purposes, I have seldom seen them drink.

One March morning in the spring of 1878, I was hunting on a small plateau in the Rattlesnake Cañon, near Camp Harney, Oregon, over which a number of large bowlders were scattered (that had tumbled down from a high, basaltic cliff above), and in passing around one of the larger ones, I suddenly came face to face with one of these birds feasting on a large yellow-bellied marmot (*Arctomys flaiventer*), which it had just caught. We were within 3 feet of each other before either of us was aware of it, and it would be hard to tell which was the most surprised. As the bird was one of a pair that furnished me regularly with a handsome set of eggs each year I did not further disturb it. It made no hostile demonstrations, notwithstanding I had spoiled its breakfast, which it left behind, and was soon out of sight, much to the delight of several Magpies which had been watching from a safe distance for a chance to pick up such stray morsels as the Eagle might leave behind. As these birds are usually only seen in pairs at all times of the year, I am inclined to believe that they remain mated for life, notwithstanding the fact

that the eggs differ very greatly in markings from year to year, although coming from the same nest and evidently from the same pair of birds.

In southern Oregon each pair of Eagles seem to confine themselves to a certain district, over which they hunt, and no others are allowed to encroach on their ground. All the nests in that region which I know of were about 20 miles apart.

Nidification begins early. In southern Arizona Mr. W. E. D. Scott saw them carrying nesting material on December 10, 1884, and they probably lay in January or February. In California full sets of eggs are usually found between the 10th and 20th of March and occasionally in the last week of February. In southern Oregon they lay between April 1 and April 10; in Colorado about the middle of March; in the far North, in the Arctic regions, from about the 1st of May to the beginning of June, Mr. R. MacFarlane taking eggs but slightly incubated on June 23, 1862, near Franklin Bay, British North America, within the Arctic circle. There they are summer visitors only, and in the United States constant residents wherever found.

The nest of the Golden Eagle is a large structure; one near Camp Harney, Oregon, situated in a large pine tree close to the trunk and about 50 feet from the ground, was 3½ feet high by 3 feet wide. It consisted of large sticks, some of these over 2 inches in diameter, and it was sparingly lined with bits of juniper bark, pine needles, and green fir tops, evidently broken off by the birds. This nest when first found, on May 18, 1875, contained two young, probably two weeks old. These I took three weeks afterwards and kept them over two years. The top of the nest was nearly flat, and contained, besides the birds, a medium-sized marmot (*Arctomys flaviventer*), partly eaten. The parents made no resistance when the young were taken, although the latter protested considerably while being put in a gunny bag. The male flew at once out of sight and the female circled around at a great height, uttering shrill cries resembling the syllables "kiah-kiah-kiah." The young Eagles were very cleanly, fed readily on fresh meat and such birds and small mammals as I could obtain for them, and they at first used water freely. They grew finely, and the difference in size between these two birds, in their second year, and an old male caught about that time was astonishing; the latter looked dwarfed alongside of them, due possibly to their always having an abundance of food and plenty of clean water, as well as a roomy stable to exercise in.

Mr. Denis Gale writes me: "Here in Colorado, in the numerous glades running from the valleys into the foothills, high inaccessible ledges are quite frequently met with which afford the Eagles secure sites for their enormous nests. I know of one nest that must contain two wagon loads of material. It is over 7 feet high and quite 6 feet wide on its upper surface. In most cases the cliff above overhangs the site. At the end of February or the beginning of March, the needed repairs to the nest are attended to, and the universal branch of evergreen is laid upon the nest, seemingly for any purpose save that of utility. This feature has been present in all the nests I have

examined myself or have had examined by others; it would seem to be employed as a badge of occupancy.

"I am familiar with a case in which the female was shot in the early part of the winter. When the nesting time came around the male was constantly about the nest for days, screaming in the most frantic manner; when the time arrived for the eggs to be there, as was the case the previous season, with the assistance of a rope let down from above, I climbed to the site to find nothing new about the nest but a small fresh branch of evergreen. I afterwards learned that the female had been shot.

"My experience has been that the birds are in no way aggressive or even demonstrative while being robbed of their eggs; circling round at a great height, from which they watch the proceedings with seeming indifference."

In an interesting article on the nesting habits of the Golden Eagle in Zoe (Vol. 1, April, 1890, No. 2, pp. 42–44), Mr. H. R. Taylor makes the following statements: "The sitting bird is said to leave the eggs uncovered for several hours after 12 m. on sunny days, while it takes recreation in flying with its mate. * * * After several years' study of these Eagles the writer feels that he has formed the acquaintance of a number of individuals of this species, and this purely from the regularity of their habits. The first Eagle I ever saw in Santa Clara County was moving about the grassy top of a big hill, and on nearly every day thereafter I observed him at his favorite playground. On my visit the year following he was still doing "lookout" duty at his old post. The nest of this Eagle had a curious ornament to the interior in the shape of a large 'soap root.' The new nest, built the year after, also contained a soap root (probably *Chlorogalum pomeridi?*), which fact is of interest as showing the individuality of my feathered friend. Another Eagle I know has a singular predilection when nest-building for grain sacks, which it uses chiefly in the lining. When I first discovered this Eagle's nest there was one of these large sacks inside. The heavy storms of the next winter dislodged its nest and in the new one built I was surprised and interested to observe a grain sack. * * *

"A curious circumstance about the Eagles that make their home near Sargents is that several pairs always seen there apparently do not nest. The nature of the country in some of the hills is such that one accustomed to riding about might actually know every tree where the birds could build, so that an undiscovered nest would be an impossibility. My friend showed me a pair of Eagles that had lived in the hills just back of his house for many years. He also pointed out to me their nest, which the Eagles repaired last year but did not use. He says they have not laid since 1884, when they had three eggs. This pair stay about the place all the year, living largely (like the other Eagles thereabouts) on ground squirrels. They are accustomed to roost in one particular tree. I heard them uttering their peculiarly plaintive whistle in the mornings several times during my stay.

Their nest was not much over 300 yards from the house and was a large structure built on a horizontal limb about 40 feet from the ground."

Mr. W. Steinbeck, of Hollister, California, wrote me in April, 1885, as follows: "All the Golden Eagles' nests I found about here have always been placed in trees, and there were plenty of cliffs within 10 miles of these nests. I have taken eight sets of eggs, found two nests with young, and also examined nine old nests, which I am certain belonged to this species. With one exception I found all these nests on hillsides, and one of them within 200 yards of a large cliff; there were, however, a number of nests some distance back in the mountains among the rocks which I have not been able to take. The nests, with the single exception of one which was placed in the bottom of a small ravine, usually commanded a good view of the entire valley before them, and they were generally placed in oak trees from 20 to 50 feet from the ground. Some of the nests were quite large, measuring 5½ feet in diameter, and all were nearly flat on top, with just enough depression to bring the top of the egg on a level with the sides. Some were lined with grass and straw, others with the hair-like tops of the Spanish soap root, one was finished off with Spanish moss, and in another I found quite a number of feathers, evidently from the breast of the parent.

"These Eagles nest where they can most easily procure food. Each pair has its range, and will drive any outsider away from it. These ranges are usually from 2 to 6 miles wide, and the birds become so attached to them that it seems impossible to drive them away. In one case, where I took three sets of eggs in successive years and killed the female, the male procured another mate and occupied the same nest again next season. In no case was I molested by one of these birds when taking their eggs. Sometimes I sat for hours in the nest waiting for one of the birds to come within gunshot, but with only one or two exceptions the birds left the vicinity, and I did not even obtain a second sight of them. Generally on approaching a nest the male will fly over, as if he had been watching, and come within 300 or 400 yards of it, he will then sail slowly out of sight. When about half a mile from the nest the female will also leave, come a little closer to the intruder than her mate, and then disappear.

"On two occasions I have flushed the bird from the nest and in both cases found the eggs well incubated. The last nest I took was from a bird which did not leave the nest until I almost put my hand on it. I think she was in the act of laying, at least the egg had that appearance. A nest found on March 1, 1885, contained a single egg, and on a second visit, March 4, I found the set complete. Of course the first egg may have been laid a day or two before I found it. Both were perfectly fresh. I am satisfied that incubation does not begin till the set is complete, and I know that both young leave the nest at the same time, and all the eggs taken by me which had been sat on were both in the same stage of incubation.

"Here they feed principally on ground squirrels and rabbits, and occasionally on carrion. In the winter when other game is scarce they hunt Wild Geese and Ducks, making a kind of 'swoop' when in chase, and should their first attempt be unsuccessful, they will rise in the air and make a second trial. My nests have all been found in the southern extremity of the Santa Clara Valley, and were within 2, 4, and 6 miles of each other. There are a number of other nests of this species in the mountains near by, which I have not been able to find, and in one locality there I have frequently seen as many as six of these Eagles sailing about; possibly this may be a bit of neutral ground, but their nests cannot be far away.

"I have a set of Golden Eagles' eggs taken March 17, 1885, which are, with the exception of a few dirt stains, pure white. They are unquestionably identified. The previous year I obtained a very dark colored and well marked set of eggs from the same nest and apparently the same bird. The eggs vary greatly in markings. I have one egg that is as thickly covered with light brown spots as that of a Marsh Wren (*Cistothorus palustris*). Scarcely two sets are marked alike."

On July 12, 1890, Mr. Steinbeck wrote me as follows: "A very interesting fact which I noticed this season for the first time is that a few days before nidification commences these birds will sit perched closely together on a limb of some tree near the nest.[1] Of sixteen nests taken by me, twelve were found on hillsides commanding an extensive view. Two were placed on the sides of gulches at the bottom of deep ravines, and two out on the plains; fifteen of these nests were in live oaks and one in a white oak. These nests were of all sizes, some being not much larger than those of the Western Red-tailed Hawk (*Buteo borealis calurus*), others measured 5½ feet in diameter, and were large enough to fill a wagon.

"I believe that in excessively wet seasons like the past one (1890), the majority of these birds do not nest. When disturbed in their nesting they will likewise occasionally refrain from laying that season, although they remain in the same neighborhood throughout the year. They are a very suspicious bird, and it takes very little to disturb them."

My friend Dr. James C. Merrill, U. S. Army, writes me: "A nest found May 22, 1883, was placed on a ledge of rocks on Indian Creek, a small tributary of Pryor's Creek, near its junction with the Yellowstone River, about 33 miles from Fort Custer, Montana. It was located about 15 feet from the top and 25 feet from the bottom of the ledge, and had apparently been occupied for several years. It was a large platform of branches and twigs, a felted mass of cattle's hair forming the lining. The day before my visit it contained two eggs, but these had just hatched when I was there. A dead Sharp-tailed Grouse was lying in the nest. In the Big Horn Mountains, Montana, a pair of these Eagles were seen repairing their nest April 10, 1883."

[1] This is a peculiarity with many Raptores, and has been noticed by myself.

Quite a number of eggs have been taken in California during the last ten years, and the nests were nearly all placed in trees. Dr. Arthur Lemoyne, in his "Notes on Some Birds of the Great Smoky Mountains of North Carolina," published in the Ornithologist and Oölogist (Vol. XI, 1886, p. 148), mentions taking a set of these eggs in the same year on Bald Mountain, North Carolina, the only recent eastern record I have seen.

But one brood is raised in a season, and if the first set of eggs is taken the birds will not lay a second one that year. Mr. Steinbeck, however, believes that the same pair of birds from which he took a set of eggs on February 26, 1885, repaired another old nest in the vicinity, and this contained a single egg on March 28, when it also was taken. The pair of birds from which I obtained several sets of eggs while stationed at Camp Harney, Oregon, used two nests about a mile and a half apart in the same cañon, but on opposite sides. The year after I took the young they used the second nest, and the following spring returned to the first one again. At no time, however, was a second set of eggs laid the same season, although the birds remained in the vicinity the entire year.

The Golden Eagle generally lays two eggs, rarely three, and I believe these produce birds of different sexes. The U. S. National Museum collection contains a set of three eggs of this species taken by Mr. James McDougall, of the Hudson Bay Company, near Fort Yukon, Alaska, in the spring of 1868, and Mr. William Steinbeck informs me that he also took a set of three on March 21, 1891. These last eggs had been incubated for probably three or four days and were all fertile. One of the eggs is almost invariably a trifle larger than the other. Several days, sometimes a week passes between the laying of the eggs. Incubation lasts about four weeks, and from personal observation I believe the male does not take part in this to any great extent, but supplies his mate with food while she is so engaged. The young when first hatched are covered with white down and grow very rapidly, but it takes fully two months or more before they are able to fly and leave the nest. They remain in company with the parents but a short time, and are cast off as soon as they are able to take care of themselves. The usual call note is a shrill "keé,-keē,-keé," uttered in a high tone; it is often heard in the early spring before nidification commences. Another note, not so frequently used—one of alarm—is "kiah-kiah," repeated a number of times.

The eggs vary from an ovate to a short ovate. Their shell is coarse, thick, and roughly granulated. The ground color is a dirty white, in some specimens approaching a pale cream color. The markings of these eggs vary greatly, one set in the U. S. National Museum collection being almost pure white, without a spot of any kind on them, excepting a few stains. Others are thickly blotched and spotted with various shades of brown, claret, walnut and ferruginous brown predominating. Some are principally marked with fine spots and blotches of drab color and vinaceous rufous. In a few specimens pearl gray and lavender shell markings, sparingly overlaid with darker tints,

predominate, but in the majority of specimens these lighter tints are entirely absent. Except the unspotted eggs, no two are exactly alike. An egg kindly sent by Mr. William Steinbeck for examination is heavily and uniformly blotched with fawn color, hiding the ground color almost completely. At the larger end this color is confluent and obscures it entirely. It is the heaviest marked egg of this species I have ever seen, and is figured. In the majority of specimens the markings are heaviest about the larger end; in a few the reverse is the case, and in others the markings, generally small in size, are regularly distributed over the entire surface. There is considerable difference in size. The twenty specimens in the U. S. National Museum collection—mostly from Arctic regions, excepting a few collected by myself in Oregon—average 74.5 by 59 millimetres. The largest of these eggs from Fort Yukon, Alaska, measures 81 by 64, the smallest 71.5 by 54 millimetres. This was taken at Anderson River Fort, Arctic America.

The measurements of twenty-eight specimens, all taken by Mr. Steinbeck, near Hollister, California, give an average of 75 by 58 millimetres. The largest of these eggs measures 76 by 63.5, the smallest 71.5 by 56 millimetres. These figures are based on Mr. Steinbeck's measurements.

Of the type specimens, No. 20699 (Pl. 9, Fig. 5), selected from a set of two eggs from the Bendire collection, was taken by the writer in Rattlesnake Creek Cañon, near Camp Harney, Oregon, April 9, 1877. It is one of the finer and more uniformly marked specimens in the collection. The heavily marked specimen (Pl. 9, Fig. 3) was taken by Mr. William Steinbeck on February 28, 1886, near Hollister, California, and kindly loaned for figuring.

## 90. Thrasaëtus harpyia (Linnæus).

HARPY EAGLE.

*Vultur harpyia* Linnæus, Systema Naturae, ed. 10, I, 1758, 86.
*Thrasaëtus harpyia* Gray, Proceedings Zoölogical Society, 1837, 108.
(B —, C —, R 450, C 631, U 350.)

Geographical range: Tropical America in general, south to Bolivia and Paraguay, north to Mexico, and rarely to the mouth of the Rio Grande (and in Louisiana?).

The Harpy Eagle if not the largest is certainly the most powerful of all the birds of prey found on the North American continent, and can only be considered as a straggler, having been noticed in the Lower Rio Grande Valley in Texas. No specimens have as yet been taken within our borders. It breeds in southern Mexico and thence southward as far as Bolivia and southern Brazil.

In an interesting article in the American Naturalist (Vol. xii, 1878, pp. 146–157), Dr. Felix L. Oswald gives the following account of the nesting habits of this species. While evidently misinformed as to the size of its eggs, and its occurrence in southern California, his statements otherwise are seem-

ingly correct. He says: "The Harpy Eagle (*Harpia destructor*) has been shot in the mountains of southwestern Bolivia, in the Mornes du Diable of San Domingo, and in the valleys of southern California; but a hunter may range those regions for years without getting a chance to add to his trophies the feather coronet of the *Aquila real*, the King Eagle, as the Spaniards call him, while every farmer's boy of an Oaxaca Mountain village knows an eyrie or two in the neighboring crags, which he is ready to rob of its eaglets or large white eggs for a couple of reals. From the projecting rocks of the Lower Sierra on any bright morning of the year one may see the hovering form of the Destructor suspended in the clear sky or wheeling in ascending circles over the misty ocean of foliage; and from March to the end of June the tree tops of the *Tierra caliente* resound with the screams of the ever-hungry eaglets. * * *

"The *Lobo volante*, or Winged Wolf, as Quesada translates the old Aztec name of the Harpy, attacks and kills heavy old Turkeycocks, young fawns, sloths, full-grown foxes and badgers, middle-sized pigs, and even the black Sapayou monkey (*Ateles paniscus*), whose size and weight exceed its own more than three times. * * *

"As soon as the lengthening days of the year approach the vernal equinox the hen Harpy begins to collect dry sticks and moss, or perhaps only lichens, with a few clawsful of the feathery bast of the *Arauca* palm, if her last year's eyrie has been left undisturbed. Her favorite roosting places are the highest forest trees, especially the *Adansonia* and the *Pinus balsamifera;* the more inaccessible rocks of the foothills are also commonly chosen for a breeding place, and it is not easy to distinguish her compactly built eyrie on the highest branches of a wild fig tree from the dark colored clusters of the Mexican mistletoe (*Viscum rubrum*) which are seen in the same tree tops. The eggs are white, with yellowish brown dots and washes, and about as long though not quite as heavy as a hen's egg. Of these eggs the Harpy lays four or five, but never hatches more than two, and, if the Indians can be believed, feeds the first two eaglets that make their appearance with the contents of the remaining eggs.

"The process of incubation is generally finished by the middle of March, if not sooner, and from that time to the end of June the rapacity of the old birds is the terror of the tropical fauna, for their hunting expeditions, which later in the year are restricted to the early morning hours, now occupy them the larger part of the day."

Judging from the size of several specimens of the Harpy Eagle in the U. S. National Museum collection, the egg of this species should at least be as large as that of our Golden Eagle (*Aquila chrysaëtos*), and in fact considerably larger. I have been unable to find a correct description of the egg of this species.

## 91. Haliæetus albicilla (Linnæus).

GRAY SEA EAGLE.

*Falco albicilla* Linnæus, Systema Naturæ, ed. 10, I, 1758, 89.
*Haliæetus albicilla* Leach, Systematic Catalogue of Mammals and Birds in the British Museum, 1816, 9.

(B 42, C —, R 452, C 533, U 351.)

Geographical range: Northern portions of eastern hemisphere and southeastern Greenland.

The Gray Sea Eagle is included in our fauna from its being found in southern and southeastern Greenland, where it breeds on the rocky cliffs of the seashore of Davis Straits.

Mr. Henry Seebohm, in his "History of British Birds," speaks of this Eagle as follows: "The haunt of the White-tailed Eagle is not necessarily a maritime one, although the bird is more attached to the coasts and the sea cliffs than the Golden Eagle. It may, however, be often seen far away from the ocean, choosing for its haunt some large inland lake, especially if there be lofty cliffs and rocky islets on which it can perch to scan the surrounding country.

"The haunts of this noble looking bird are the brown hills of the Hebrides and the adjacent isles, and the wild mountain country of the mainland in the West. On the bold and rocky headlands of this wild, rugged coast, whose hoary peaks are washed by the treacherous waters of the Minch, the Sea Eagle finds a congenial home. The scenery of Skye is typical of this Eagle's favorite haunt. On that bleak and desolate isle it occurs in probably larger numbers than in any other place in Great Britain. * * *

"In Pomerania, especially between Stettin and the Baltic, the Sea Eagle is a common resident, breeding in forests. It builds an enormous nest, sometimes 6 to 8 feet in diameter, near the top of a pine, or on the horizontal branch of an oak or beach, preferring forests near inland seas and large lakes. Instances have been known of its breeding in the same 'horst' for twenty years in succession. Every year some addition is made to the nest, until it becomes 5 or 6 feet high. Occasionally a pair of Sea Eagles have two 'horsts,' which are used alternately. They are shy birds and leave the nest at the least alarm, but do not easily forsake their old home. If the eggs are taken early in the season they will frequently lay again in the same nest. They make a very flat nest, and generally line it at the top with moss. The male and female are said to sit alternately, and the female is said to be shyer than the male at the nest. Two is the usual number of eggs, but frequently only one is found; in rare cases as many as three are laid. Eggs may be taken from first week in March to the middle of April. * * *

"The White-tailed Eagle is undoubtedly mated to its partner for life, and even should one of the birds be destroyed the survivor will obtain a fresh com-

panion in an incredibly short space of time—a habit peculiar to most if not all rapacious birds. For many seasons in succession this bird returns to its old eyrie, merely making a few necessary alterations each season, adding to the structure, or making good what damage it may have sustained during the storms of the previous winter.

"The site is varied according to locality, and may be on rocks, in trees, or on the ground. In the inland districts the birds usually select a rocky islet in the middle of a loch, where they either build their bulky nest on some ledge of the sloping ground, in a tree, or on the rocks, as occasion offers. Sometimes a site is chosen at some distance from the water in small open woods, but such instances are rare; inland rocks, too, are often selected in similar places to those which the Golden Eagle frequents—broken cliffs, often quite easy of access from above or below. But the most characteristic eyries of this bird in our islands are on the coast, built high up in the almost inaccessible rocks, hundreds of feet above an ever turbid sea, and in situations to which none but the most intrepid climbers dare venture. Some nests in these situations are indeed quite inaccessible, and the birds have remained in undisturbed possession from time immemorial. * * *

"Several instances are recorded of the Sea Eagle breeding upon the ground. Herr Tancré describes a nest which he found upon the island of Hiddensoe, on the southern shores of the Baltic, near Stralsund, on the naked meadow among the reeds. The nest was carefully made of sticks and was about 2 feet high.

"The food of the Sea Eagle consists of fish, sea fowl, and occasionally carrion. Dixon states: 'Within my own observation the favorite food of this Eagle is the stranded fish and shore garbage on the beach of its maritime haunts; while farther inland a dead carcass or a weakly bird or animal are shared with the Ravens and the Crows.'"

According to Seebohm, the eggs of the Gray Sea Eagle vary from 69.8 to 83.8 millimetres in length, and from 53.3 to 60.9 millimetres in breadth They are pure white in color and ovate to rounded ovate in shape. The shell is coarse, granulated, and usually considerably nest stained, giving it a yellowish appearance.

Three eggs from southern Greenland, in the U. S. National Museum collection, measure, respectively, 80 by 59, 76 by 57.5, and 75.5 by 61 millimetres.

They are scarcely distinguishable from the eggs of the Bald Eagle (*Haliæetus leucocephalus*), excepting that they are somewhat larger. None are figured.

## 92. Haliæetus leucocephalus (Linnæus).

BALD EAGLE.

*Falco leucocephalus* Linnæus, Systema Naturæ, ed. 12, I, 1766, 124.
*Haliætus leucocephalus* Boie, Isis, 1822, 548.
(B 41, 43, C 362, R 451, C 534, U 352.)

Geographical range: Whole of North America and across the Aleutian chain to the Commander Islands, Kamchatka.

The Bald or American Eagle, our national emblem, is pretty generally distributed over the entire United States, and breeds more or less abundantly according to food supply along the Atlantic seacoast, from northern Maine to Florida and from the Gulf of Mexico throughout the total length of the Mississippi Valley and the larger streams and lakes of the interior, as well as British North America, to the Arctic coast. It is quite abundant on the Pacific coast, and especially common at the mouth of the Columbia River, the shores of British Columbia and the Alaska mainland, as well as on all the Aleutian Islands. It appears to be equally indifferent to extreme heat or cold, but in the northernmost portions of its range it is only a summer resident, leaving these inhospitable regions and retiring to a warmer climate as soon as the rivers and lakes freeze up, which furnish it with most of its food supply.

Within the United States, it is perhaps more abundant in Florida than anywhere else. Dr. William L. Ralph furnishes me the following observations on this species, made principally in the immediate vicinity of Merritt Island, Indian River, Florida, during February, 1886, and the two succeeding winters. He says: "Before I discovered this paradise for these noble birds, I would not have believed there were so many east of the Mississippi River as I found there within a radius of a few miles; for I not only saw them in great numbers, but found, with the help of an assistant, nearly one hundred occupied nests and took thirty-five sets of eggs.

"Frequently when returning to the hotel at Rockledge, just before dark, I would while crossing the island opposite the village, a distance of about a mile, see fifteen or twenty Eagles, most of them birds in young plumage, roosting in the trees, and it was no uncommon thing to see six or eight in one flock.

"Notwithstanding these birds were so very common, I concluded from the great number of deserted nests found that they must have been more abundant formerly, and, on inquiry among the inhabitants, found this to have been the case.

"These Eagles seem to breed earlier than those in other parts of Florida, due no doubt to the immense number of waterfowl, especially Coots (*Fulica americana*), that frequent this vicinity during the winter, and which seem to form the principal article of their food, though they will sometimes

condescend to eat fish, like their more northern brothers and sisters. I have often seen them catch wounded birds, and I visited one nest that contained in addition to two well grown young birds the remains of thirteen Coots and one catfish. Most of their eggs are hatched by the middle of December, and some must be laid as early as the 1st of November, as my assistant found a nest containing two eggs on the point of hatching on December 5, and I found young birds two or three weeks old on December 15. The latest sets I collected were one of two fresh eggs, taken January 26, and another of two, one egg of which was nearly hatched and the other addled, taken February 3. The eggs of this species from this vicinity are more elongated and on the average smaller than the descriptions and measurements usually given of the eggs taken farther north.

"From what I could learn these birds invariably lay two eggs, as I never found a larger set, and where I found but a single egg, it was always fresh. On several occasions I found but one young bird in a nest, and as I took quite often a set of two eggs, of which one was addled, I concluded that this was the reason. One peculiarity of the Bald Eagle that I have never noticed in other birds of prey is, that when a pair are robbed of their eggs or young, they will not lay again until the next season. I watched a great many nests after they were robbed, visiting some close by where I lived every few days for a period of two months or more, yet, notwithstanding I almost always found one or both birds at home, I never succeeded in getting two sets of eggs from the same nest during the same season, though the next year these nests were again occupied.

"The nests are immense structures, from 5 to 6 feet in diameter and about the same in depth, and so strong that a man can walk around in one without danger of breaking through; in fact my assistant would always get in the nest before letting the eggs down to me. They are composed of sticks, some of which are 2 or 3 inches thick, and are lined with marsh grass or some similar material. There is usually a slight depression in the center, where the eggs are placed, but the edge of the nest extends so far beyond this that it is almost impossible to see the bird from below, unless it has its head well up. I have frequently found foreign substances in their nests, usually placed on the edges of it, the object of which I cannot account for. Often it would be a ball of grass, wet or dry, sometimes a green branch from a pine tree, and again a piece of wood, bark, or other material. It seemed as if they were placed in the nests to mark them. From its frequent occurrence, at least, it appeared to me as if designedly done.

"I believe these birds have a certain time for laying, and that their eggs are deposited within a few days of that time every year. In the vicinity of San Mateo, Florida, the Bald Eagle is now quite rare, and I know of but one nest that is occupied by these birds. This season they began sitting on January 31, the earliest date on which I have ever known them

to begin here, and, during the several years I have known this nest to be occupied, I do not remember them ever commencing to lay later than February 6 or 7. I also think if one of a pair be killed after they have eggs or young, if nothing further happens, that the remaining bird will perform all the duty of incubation and care for the young.

"Two of my assistants watched the nest previously referred to during the present season, 1891, and on the day the birds were first found sitting both my men had visited the place, and on their return I saw them separately when they both told the following story. They said 'that they found one of the Eagles on the nest and that on pounding on the tree it flew to another near by and gathered a bunch of Spanish moss in its claws. It then flew slowly back over the nest, and, when just above it, poised for a moment on its wings, and dropped the moss, which nearly fell into the nest.' I believe this to be true, for I questioned both of the men very closely and they told exactly the same story, and they know nothing about the habit these birds have of marking their nests.

"Nearly all the nests I found were in pine trees, and generally the highest and thickest the birds could find, but as pines in this locality are not very tall, the majority of the nests were only 50 or 60 feet above the ground. The highest and lowest locations of nests were 75 and 30 feet, but these were extremes, at least so far as occupied nests were concerned. The places the Bald Eagle likes to frequent are forests of tall heavy timber in the immediate vicinity of some good-sized body of water, and they almost always build their nests in such situations. Both sexes assist in incubation, and are equally solicitous in the care of their eggs and young. They show great distress when their nests are disturbed, but are very careful to keep just out of gunshot, and I can recall but one instance of the Bald Eagle's attacking anyone, and that was a pair which had a nest in a large pine tree near the south shore of Crescent Lake, Florida. These birds would swoop down and almost strike the head of my climber, and were so very savage that one of my party became frightened, and thinking they might injure him, shot the male, which was the fiercer of the two. The nest contained two young but a few hours old, and as I was afraid they would either starve, or that Vultures or Crows would get them while the mother bird was absent after food, I thought I would try to raise them myself.

"They throve splendidly on a diet of meat and fish, and the amount they would consume in the course of twenty-four hours was something wonderful. I would stuff them, until I was almost afraid they would burst, in hopes of keeping them quiet for a few minutes; but it was no use, for the first noise they heard would set them yelling as loud as ever. I kept them until I left Florida, a period of almost two months, and they were then nearly half grown, and the family with whom I lived promised me to care for them. Soon after my departure one of them was injured and died shortly afterward, but the other got along nicely, and on my return the next winter,

I found it still alive. One peculiar thing about this bird was that it never learned to fly, though it was not confined during the first year. Its wings did not grow to the proper length and the feathers on them were twisted in all directions. It had a very rough and dilapidated appearance generally, which I cannot account for, as it was never handled much. While not afraid of man, this bird was a great coward in other respects, and would run from any other animal of whatever size; even a chicken would greatly frighten it.

"It would seem from what little chance I had of noticing the growth of these young Eagles, that unless they grow much faster in a state of nature than in captivity, birds of this species must remain in their nests from three to four months. They are very much attached to their chosen homes, and although their eggs and young may be taken from them for several successive seasons, and even one of the old birds killed, the survivor will find another mate and return to the old eyrie another season.

"The cry of the male is a loud and clear 'cac-cac-cac,' quite different from that of the female, so much so that I could always recognize the sex of the bird by it; the call of the latter is more harsh and often broken. Bald Eagles are constant residents of this vicinity, as they are of most parts of Florida, unless, as the inhabitants say, they go away for awhile during the summer. This I believe to be true, for there must be a scarcity of food then, when the waterfowl go north, as most of them do early in the spring. I believe the Bald Eagle does not breed before getting the adult plumage, and that this is the case generally with birds of prey, with few exceptions."

In the vicinity of Corpus Christi, Texas, the Bald Eagle breeds sometimes on the ground. Capt. B. F. Goss writes me as follows: "Of six nests of this species examined by me, near the above mentioned locality, all within 25 miles of it, four were found in trees, but the two others deserve special mention, as both were placed on the ground on small islands in Nueces Bay. An assistant, whom I hired to help me in collecting, showed me a nest from which he had taken the two young about five days previously, and had them in his possession at the time. The nest was placed on a small island, not more than 2 feet in its highest part above high water mark, and, with the exception of a little grass growing in the central part, it was a bare sand reef. The nest site, for it could hardly be called a nest, was located in the center of the island. It consisted simply of a few sticks laid on the bare ground, not enough to make a single tier even, and these were covered with bones, feathers, and fish scales, and the ground in the immediate vicinity was littered with the remnants of their food and the excrement of the young. We also found a small armadillo on the island, which was evidently brought there by the Eagles to feed their young, who probably found the shell too hard for them to crack, as it appeared uninjured. The owners of this nest were said to have been in the immature plumage, which accounts for the poorly constructed nest, probably being a first attempt.

"About the middle of the month I found another nest of this species on an island in the upper part of the bay, about 5 miles from the former. This was a massive structure, also built on the ground, at least 6 feet high and 5 feet in diameter. I saw it fully 2 miles away, and from that distance it looked like a monument. Although out of our course, and in a secluded part of the bay, it so aroused my curiosity that I ordered my boatman to pull to it. It contained a single young Eagle, nearly half grown. This island was larger and also a little higher than the first, and a solitary small tree was growing on it some 2 rods from the nest. Otherwise it was quite bare. This nest was quite a prominent object and was visible for miles. It was built with surprising regularity, appeared to be a perfect circle, and the sides smooth and almost perpendicular. The top sloped slightly toward the center where the eaglet sat, which viciously snapped at me as I looked over the edge of the nest. It was built of sticks and had evidently been raised to the present height by successive yearly additions, as the lower half had begun to decay, and a few inches of the top had evidently been recently added. Both parent birds attacked us with great fury, screaming and striking at us with their talons; while examining the nest they came within a few feet of me and I was glad to retire. This pair were both adult birds. Sometime later, as my assistant was taking the eggs from a nest in a tree, he was set upon by both the Eagles, and if he had not had a good stick to defend himself, I feel sure they would have struck him; as it was, they approached within 3 feet of him. These are the only two instances coming under my observation where any attempt was made to defend the nest."

That the Bald Eagle shows considerable courage at times in the defense of its nest, even without any provocation, I can corroborate from personal observation. In the months of March and April, 1883, I repeatedly visited a low marshy swamp at the head of Wood River, about 2½ miles northeast of Fort Klamath, Oregon; the object of these visits being to locate the nest of a pair of Goshawks, which committed daily depredations among the poultry at the post, and which always disappeared in this direction. A number of large aspens and several dense groves of conifers were scattered through this marsh, as well as a few immense pine trees.

A pair of Bald Eagles nested in one of the largest of these pines, and at no time could I approach this tree nearer than 100 yards without one of these birds, probably the male, swooping down at me, sometimes as close as 20 feet, lustily screaming, and giving me plainly to understand that I had no business in that particular vicinity.

These Eagles seem to nest in trees by preference, and only where such are wanting will they resort to cliffs or to the shelves found occasionally on the river bluffs. They are far more abundant along the seashore than in the interior, but they are by no means uncommon in suitable localities on the larger inland lakes.

At the Klamath Lakes they are especially numerous, and I have repeatedly seen a dozen within a distance of 3 miles. Some of our earlier writers

speak in rather uncomplimentary terms of our national bird, stigmatizing it as a robber and tyrant, and as feeding principally on fish, stolen from the Osprey, and on carrion. This is not strictly true. According to my observations the Bald Eagle lives to a great extent at least on prey captured by its own exertions, principally on wounded waterfowl. When engaged in the chase of a flock of Geese, Brant, Ducks, or other water birds, on which it subsists almost entirely when such are procurable, it is by no means the sluggish, lazy bird some writers would have us believe, but the peer in swiftness, dash, and grace of any of our Raptores.

While it undoubtedly has occasionally to resort to an exclusive fish diet, some of which is captured from the Osprey, this habit is by no means universal, and carrion, in my opinion, is only used when other kinds of food are not available.

On May 1, 1886, Mr. S. B. Ladd found a nest of the Bald Eagle containing young in Lancaster County, Pennsylvania. The ground directly under it was covered with numbers of land terrapins in various stages of decay. These reptiles had evidently been carried to the young eaglets to feed on, were found unmanageable, and pushed out of the nest; probably but little other food was to be procured at the time.

Sometimes also when apparently fishing the Bald Eagle is after a different sort of game, as the following incident will show. Mr. W. W. Worthington writes me from Darien, Georgia: "The other day I noticed a Bald Eagle hovering over the sound, much the same as the Fish Hawk does when about to strike a fish. Suddenly he plunged down and grappled with what I supposed to be a large fish, but was unable to raise it from the water, and after struggling awhile he lay with wings extended and apparently exhausted. After resting a minute or two he again raised himself out of the water and I saw he had some large black object in the grasp of one of his talons, which he succeeded in towing along the top of the water toward the shore, a short distance, and then letting go his hold. He was then joined by two other Eagles, and by taking turn they soon succeeded in getting it to the shore. Investigation proved it to be a large Florida Cormorant, on which they were about to regale themselves."

Nidification begins early. In Florida and other parts of the Gulf coast eggs are sometimes deposited in the early part of November, but generally from the 1st to the 15th of December. In the Middle States they nest occasionally in the beginning of February, Mr. Thomas H. Jackson taking a full set of eggs in Lancaster County, Pennsylvania, on February 11. Usually they do not commence to lay till March, and correspondingly later as they advance northward.

On the Pacific coast in California, they nest about the middle of February; in Oregon and Washington, about April 1; in Alaska about the middle of the month, and in the interior, in the Arctic regions, as late as the latter part of May, and occasionally even in June.

As already stated, trees seem to be preferred for nesting sites, and large pines are oftener made use of for this purpose than other kinds. In certain portions of Florida they resort to a considerable extent to the mangroves, occasionally to live oaks, and in the West I have seen them nest in huge cottonwood trees.

The height from the ground varies considerably also, the extremes being probably from 20 to 100 feet. Cliff and bluff sites are generally used when no suitable trees are to be found in the vicinity, and nests on the ground must be considered as unusual locations and of very rare occurrence.

Incubation lasts about a month and both sexes take part in this duty. The usual number of eggs laid by this species is two, rarely less, and very seldom three; they are laid at intervals of three or four days. One of them is always somewhat larger than the other, and occasionally this difference in size is quite marked. But a single brood is raised in a season. The young at the end of the first year are considerably larger than the parents, and were for sometime considered as a distinct species, and named by Audubon *Haliætus washingtonii*—the Bird of Washington. In this plumage they are dark brown throughout, mixed with dull fulvous; they do not attain the adult plumage until the third year.

The nests vary greatly in size and are usually almost flat on top. Some are fairly well lined with dry grasses or seaweed. The eggs are pure white in color, but frequently nest stained; in very rare instances slight traces of markings are observable of a pale buffy brown, and in the handsome series of eggs of the Bald Eagle in Dr. Ralph's collection are two such specimens. The shell is strong, granulated, and without any luster. The shape varies from a rounded ovate to an ovate, the former predominating. Eggs from the more northern breeding grounds are considerably larger than those from Florida and the Gulf coast.

Sixteen specimens in the U. S. National Museum collection, principally from the Arctic regions, give an average measurement of 73.5 by 57.5 millimetres, the largest egg measuring 76.5 by 58, the smallest 69.5 by 56.5 millimetres.

Forty-five Florida specimens, all collected by Dr. Ralph, and now in his collection, give the following average: 69 by 53.5 millimetres, the largest egg of this series measuring 74.5 by 55, the smallest 61.5 by 50 millimetres. About a fair average would be 71 by 54 millimetres.

The type specimen, No. 20697 (Pl. 9, Fig. 7), from a set of two, Bendire collection, was obtained near Alden, Iowa, April 18, 1873, and was slightly incubated when found.

## 93. Falco islandus Brünnich.

WHITE GYRFALCON.

*Falco islandus* Brünnich, Ornithologia Borealis, 1764, 2.
(B 11, C 341*a*, R 412, C 501, U 353.)

Geographical range: Circumpolar regions, including Greenland, Arctic America, Commander Islands, etc.

With our present limited knowledge of the White Gyrfalcon but little can positively be stated about its breeding range, excepting that during the season of reproduction it inhabits the circumpolar regions. It breeds along the coast of northern Greenland, the ice-bound and inhospitable shores of eastern North America bordering on Baffin Bay and Smith Sound, and probably also along the numerous islands of the Arctic Sea, and the coast of northern Labrador and Hudson Strait. According to Dr. Stejneger, it also breeds on Bering Island, one of the Commander group of northeastern Asia. He says: "A pair had their nest in a steep and inaccessible rock in the so-called 'Nakovalnaga,' a couple of miles from the main village." A male was shot by him on August 27, 1882, and a female on May 2, 1883.[1]

This species is the lightest colored of the Gyrfalcons. Gen. A. W. Greely, Chief Signal Officer, U. S. Army, says: "The Greenland Falcon was probably seen by the Polaris Expedition about May 22, 1872. Mr. Hart noticed these birds nesting in cliffs near Cape Hayes, latitude 79° 42′ N., and a Falcon was seen near Cape Frazer, latitude 79° 44′ N., August 24, 1876. The latest specimen in Smith Sound was recorded by Hayes during his boat journey on Northumberland Island, near Cape Alexander, September 10, 1854. We saw an example August 4, 1881, just north of Carl Ritter Bay, and another near Fort Conger on July 30, 1882, the attention of Sergeants Jewell and Ralston being called to the latter through the great alarm shown by the Buffon's Skuas in their vicinity. Three Falcons were seen August 13, 1882, in the valley at the head of St. Patrick Bay, about latitude 81° 55′ N., attracted by offal. They were observed in the same locality August 15, and a pair of them flew around Fort Conger two days later."[2]

Nelson found the White Gyrfalcon rare in Alaska and only secured a single specimen of this bird, an Eskimo kin, taken at Cape Darby, on the Alaskan shore, near Bering Strait. The natives also told him that these White Hawks sometimes bred on the mountains of the Kaviak Peninsula, but he had no means of personally verifying this statement, although his solitary specimen came from there.

According to Kumlien, it is very rare on the Cumberland Gulf side of Davis Strait, and much more numerous on the Greenland shore. He says that it is apparently much slower on the wing than the common Duck Hawk,

[1] Bulletin 29, U. S. National Museum, 1885, p. 205.
[2] International Polar Expedition to Lady Franklin Bay, Grinnell Land, 1888, Vol. II, p. 26.

that it was seen pursuing the Gulls until they were exhausted before the Hawk could secure its prey, showing that their endurance exceeds their speed.[1]

Turner obtained a single specimen at St. Michael, Alaska, May 15, 1877, and says that it is not a common bird in that vicinity, and oftener seen in the spring than at other seasons. In his notes "On the Birds of Labrador and Ungava," he states: "This beautiful Falcon is common throughout the entire region, although more numerous in the sparsely wooded tracts and in the neighborhood of high rugged hills. This species is known as the Partridge Hawk by the English-speaking people, who apply the name of Partridge to both species of *Lagopus* and to *Dendragapus* indiscriminately. In the vicinity of Fort Chimo it is not at all rare in winter, but so wary that but one specimen was secured.

"A pair was building their nest on the side of the bluff known as Hawk's Head, some 2 miles north of Fort Chimo. I undertook to ascend the bluff by means of a rope drawing me up a distance of 168 feet, where I had nothing to cling to but the rope, and after whirling around and around dozens of times (as the nest was on a part which could not be reached from above), reached the spot where the nest was located. I was then so dizzy that I was glad to find a resting place, and when I attained the site I put my foot directly on the half completed nest, composed of a few sticks and a great quantity of dry grasses, forming a bulk about 15 inches across the top and 3 inches high. The birds were circling and screaming a short distance off while a man was firing at them. They deserted the locality and were not again seen.

"This Falcon is extremely shy, and when sitting with its pure white breast toward the hunter will often escape detection on the snow, as it is far more numerous from September to April than at other times. The natives assured me that they repair to the rugged mountains in the vicinity of Cape Chidley (the northernmost point of Labrador) to breed, and that they fed their young on the Rock Ptarmigan, which also seek that region for the same purpose. The manner of flight is by rapid beats of the wings, followed by a short sail."

The nesting habits of the White Gyrfalcon would appear, from what little we know on the subject, to be in no way different from those of the other members of this genus, excepting that they probably nest almost exclusively on rocky cliffs near the seacoast. Few suitable trees, even in the more southern portions of their summer range, would be found in these northern regions sufficiently large to hold their nests. As a rule, these rocky cliffs are the summer homes of innumerable waterfowl, on whose young, as well as on Ptarmigan, they prey to a great extent during the season of reproduction.

The usual number of eggs to a set is probably three or four, and they are not likely to be deposited much before May 1.

[1] Extracts from Nelson's Report on Natural History Collections made in Alaska, 1877–1881, pp. 145, 146.

Of the two specimens, both from different nests, in the U. S. National Museum collection, and about whose correct identification I am by no means satisfied, No. 2606, marked *Falco candicans*, collected in Greenland in 1858, and purchased from Madam H. Drouet, measures only 57 by 45 millimetres, and seems to be too small an egg to belong to this bird. No. 13231, obtained from Dr. T. M. Brewer, and also from Greenland, is more of the probable size, measuring 59.5 by 46.5 millimetres.

They resemble the eggs of the Gyrfalcon both in shape and color, and are not distinguishable from these, making a detailed description unnecessary. None of these eggs are figured.

## 94. Falco rusticolus Linnæus.

GRAY GYRFALCON.

*Falco rusticolus* Linnæus, Systema Naturæ, ed. 10, I, 1758, 88.
(B 12, C —, R 412*a*, C 500, U 354.)

Geographical range: Extreme northern portions of Europe (except Scandinavia), Asia, and North America, including Iceland and southern Greenland; south in winter to northern border of United States.

The Gray Gyrfalcon is another species whose breeding range is still rather imperfectly known. According to Ridgway, it inhabits the extreme northern portions of Europe (excepting Scandinavia), Asia, and North America, including Iceland and southern Greenland, and it probably breeds throughout the range indicated. In south Greenland and Iceland it is said to nest mostly on the inaccessible cliffs along the seashore, usually in close proximity to bird rocks, which supply them with an abundance of easily procured food.

The eggs of the Gray Gyrfalcon are said to be three or four in number, and indistinguishable, both in color and size, from those of the other large Gyrfalcons found in northern North America. In south Greenland they are usually deposited during the latter part of April and throughout May. There are no specimens in the U. S. National Museum collection.

## 95. Falco rusticolus gyrfalco (Linnæus).

GYRFALCON.

*Falco gyrfalco* Linnæus, Systema Naturæ, ed. 10, I, 1758, 91.
*Falco rusticolus gyrfalco* Stejneger, Auk, II, 1885, 187.
(B —, C 341, R 412*b*, C 498, U 354*a*.)

Geographical range: Northern Europe and Arctic America, from northern Labrador and coasts of Hudson Bay to Alaska.

The breeding range of the Gyrfalcon, a slightly darker colored bird than the preceding, is somewhat better known than that of the two allied subspecies already mentioned. It includes Arctic North America, from northern Labrador and the coasts of Hudson Bay, throughout the so-called Fur

Country in the interior, to Alaska. It is also found in northern Europe (Scandinavia). It apparently does not reach quite such high northern latitudes as the other subspecies already mentioned.

Mr. R. MacFarlane, chief factor of the Hudson Bay Company, states that this Falcon is common in the wooded country on both sides of the Anderson River, and from the fact that over twenty nests were secured by him this must certainly be the case. All of these nests, with but two exceptions, were placed close to or near the tops of the tallest trees in the neighborhood, generally in pines. One nest was built on a ledge of rocks and the other against the side of a deep ravine. The nests were composed of sticks and small branches and lined with mosses, hay, deer hair, feathers, etc. They were similar in composition but smaller in size than those of the Bald Eagle, and while the number of eggs was either three or four, their contents were frequently found in different stages of development.

Both parents manifested much anger and excitement when interfered with, or even distantly approached. They made a great noise, and indeed more than once their folly in coming so near and screaming so loudly over our heads attracted attention to some that would otherwise have escaped notice. The earliest date of finding a nest was May 10, 1863, at Anderson River Fort. The eggs, three in number, were quite fresh. In another, taken five days later, the eggs contained partially formed embryos. In a few cases young birds were found in the same nest with eggs, the contents of which were but little changed, and in another nest a perfectly fresh egg was found with several ready to hatch. In nearly every case the eggs seemed to be in different stages of development, and incubation seems to begin as soon as the first egg is laid.[1] The latest date on which eggs were found by Mr. MacFarlane, according to the records in the U. S. National Museum, is June 12, 1864, when two sets of four eggs each were taken.

Nelson, in speaking of this species, says: "Throughout Alaska, from the Aleutian Islands north, both along the coast and in the interior, extending from Bering Strait across the northern portion of British America, the present Falcon is the commonest resident bird of prey. It was observed by Murdoch at Point Barrow, though it was not common. It frequents the vicinity of cliffs and rocky points about the seacoast, or the rocky ravines of the interior during the breeding season; and the remainder of the year, especially in the fall, it is found wandering over the country everywhere that food can be obtained; it is especially numerous during the migration of the Ptarmigan along the seacoast. * * *

"Along the seacoast in the vicinity of St. Michael it breeds rarely, choosing rocky cliffs, facing the sea. Along the Lower Yukon, and the Kuskokwim River, it is numerous in winter, and finds an abundance of Ptarmigan, upon which it preys. At this season it is frequently seen perching on a stout branch of a tree overhanging the river bank, and I have seen it on several occasions

[1] From R. MacFarlane's Manuscript Notes on the Land and Water Birds Nesting in British America.

allow a train of dog sledges to pass within 40 or 50 yards, only noticing their presence by slowly turning its head.

"It was seen in the vicinity of Bering Strait and around the shore of Norton Sound during the cruise of the *Corwin* in the summer of 1881, as also upon the northeast shore of Siberia, in the vicinity of East Cape and Plover Bay."[1]

Mr. L. M. Turner obtained several specimens of this Gyrfalcon in the vicinity of St. Michael, where he says it is a constant resident, except during protracted periods of severe weather in winter only. According to the natives it breeds on the high hills, either on a rocky ledge or on the moss-covered ground. He failed to obtain the nest and eggs.

Mr. James Lockhart found the Gyrfalcon breeding on the Yukon River 100 miles above the mouth of the Porcupine River, and took a nest and three eggs there in June, 1862. Messrs. MacDougall and Jones also took their eggs near Fort Yukon, Alaska, in 1865, and all of these specimens are now in the U. S. National Museum collection.

From our present knowledge it appears that the Gyrfalcon breeds north of latitude 65°. It has not been found nesting farther south than this, so far as I can learn, although in winter these birds straggle sometimes into Canada and the northern borders of the United States. In Scandinavia the Gyrfalcon usually commences laying about the end of April, and the nests are generally placed on cliffs, rarely in trees.

The eggs are three or four in number. The ground color, when distinctly visible, which is not often the case, is creamy white. This is usually hidden by a pale cinnamon rufous suffusion. In an occasional specimen it seems to be pinkish vinaceous. The eggs are closely spotted and blotched with small, irregular markings of dark reddish brown, brick-red, ochraceous rufous, and tawny. These markings—usually pretty evenly distributed over the entire egg—are generally small in size, and more or less confluent. Some specimens show scarcely any trace of markings, the egg being of a nearly uniform color throughout. One of the eggs figured, from an incomplete set of two (No. 10172), both alike, is a most peculiarly marked specimen. In the general pattern of markings the eggs of the Gyrfalcon approach those of the Prairie Falcon (*Falco mexicanus*) much closer than those of the Duck Hawk (*Falco peregrinus anatum*), which as a rule are much darker. In shape they vary from ovate to rounded ovate. The shells of these eggs feel rough to the touch, are irregularly granulated, and without luster.

The average measurement of thirty-two specimens in the U. S. National Museum collection is 59.5 by 45 millimetres, the largest egg in the series measuring 63 by 46.5, the smallest 57.5 by 43 millimetres.

The type specimens figured were obtained as follows: No. 10172 (Pl. 9, Fig. 9), from an incomplete set of two, was taken June 12, 1864; No. 13790 (Pl. 9, Fig. 8), a single egg, taken in June, 1865; No. 13792 (Pl. 9, Fig. 6),

[1] Report on Natural History Collection made in Alaska, Nelson, 1877-1881, pp. 146, 147.

from a set of three, also taken in June, 1865. They were all collected by the indefatigable Mr. R. MacFarlane, near Anderson River Fort, Arctic America, situated in latitude 68° 35′ N.

## 96. Falco rusticolus obsoletus (Gmelin).

BLACK GYRFALCON.

*Falco obsoletus* Gmelin, Systema Naturæ, I, i, 1788, 268.
*Falco rusticolus obsoletus* Stejneger, Auk, II, 1885, 187.
(B —, C —, R 412*c*, C 499, U 354*b*.)

Geographical range: Coast of Labrador; south in winter to Canada, Maine, and New York.

As far as known at present the breeding range of the Black Gyrfalcon, the darkest colored bird of this genus, is confined to the coast of Labrador.

Mr. L. M. Turner, of the U. S. Signal Service, gives the following account of this subspecies in his "Notes on the Birds of Labrador and Ungava," and he has kindly permitted me to make the following extracts from the same. He says: "A number of specimens of this large Hawk were procured at Fort Chimo. * * *

"A pair of these Hawks had been frequenting the Chapel for the last six weeks and were occasionally seen throughout the winter. The nest site first selected was deserted and a new one chosen, some 200 yards to the south, but on the same side of the bluff. The Chapel is an immense rock, some 300 feet above the surrounding rocks, and gradually slopes upward to the north end, which is almost precipitous and absolutely inaccessible. The west side of the north end is nearly perpendicular for half the length, but varying some 40 to 90 feet in height along the perpendicular portion. The eastern side is more abrupt and higher, being in places over 200 feet, almost perpendicular. Here are several ledges on which these Hawks have built their nests for many years. The southern end of the hill is low and forms an easy slope to the top. The nests of these Hawks were attainable only by a person being lowered over the side of the cliff. On April 7 I observed beneath the nest site first selected a number of sticks and other refuse lying on the snow below, as though the locality had been subjected to a rearrangement or cleaning process, and such material as appeared unnecessary was rejected and cast over the side of the ledge. The site of this nest was a narrow ledge of rock which projected from the main wall and embraced an area of not over 3 superficial feet. Here were a number of spruce and larch twigs and branches of various sizes imbedded in what appeared to be the accumulated débris of many generations. Among this a few grass seeds had found enough soil to enable them to send forth a rank growth, which was now appearing. This mass or accumulation was about 10 inches deep and covered nearly the entire surface of the ledge. The new nest, forming an irregular truncate cone, was placed on this.

"On the 20th of May I again visited the locality and succeeded in putting a charge of shot into the female, which had since the 11th of the month taken up with the mate of the bird shot on that date. The one shot on the 20th fell nearly a mile distant after tumbling headlong several times through the air, and I could not find her. I supposed that the nest would now be abandoned by the male, as he was particularly wary and gave warning even when I was over a thousand yards distant.

"On May 22 I went with a party of four to lower me over the cliff to secure the eggs which might remain in the nest. To my great astonishment I found a pair of these Falcons launching into the air from the same site. I descended to the nest. In front of it huge icicles stood joined with the slightly projecting roof above the ledge; some of these ice columns were 2 or 3 inches thick and 4 inches wide, forming an icy palisade around the edge of the nest and permitting approach to the interior only by a narrow space or doorway next the main wall of rock, and I was compelled to detach the ice before I could reach the four eggs I saw within the nest, which was composed of a few twigs and branches of larch and spruce, irregularly disposed on the outer side of the rim of the nest to prevent the eggs from rolling out, forming only a semicircular protection, while the rear portion was a part of the bare rock of the ledge. Below these twigs were the remains of former nests. Some of the sticks were so rotten that they would not support their weight when held by one end. The eggs were placed nearly touching each other. They contained small embryos and had been incubated about twelve days. The parent of these is No. 94308 in the U. S. National Museum collection. * * *

"This subspecies is the most abundant of any Hawk observed in this region. During the excessively cold periods of winter but few are to be seen. About the middle of March they are more abundant and become plentiful by the last of April. * * * Their food consists almost exclusively of Ptarmigan, little else being found in their stomachs. They seize their prey while on the wing, depending doubtless on their sudden appearance among a flock of Ptarmigan to put their prey to flight, when it may be secured. Their food is devoured on the ground; I have never seen them carry it in their talons.

"The young birds are able to leave the nest by the middle of August, and in September of some years they are quite abundant, flying over the houses at Fort Chimo with but little fear. * * * Their manner of flight is by extremely rapid wing beats followed by sailing for a few rods. They pass through the air with great rapidity, no bird of prey in those regions flying more rapidly. * * * The only note ever heard from this Hawk was a chattering scream of the syllables 'ke-a, ke-a, ke-a,' repeated a number of times, more rapidly toward the fifth or sixth utterance, and finally so blended that the sound is a rattling scream. I have never seen one of these Hawks alight in or fly from a tree. In the Ungava district they invariably select a ledge of rock on the cliffs for nesting places."

"On August 6, 1833, Mr. John W. Audubon found a nest of this Falcon among some rocky cliffs near Bras d'Or, Labrador, containing four young birds ready to fly, two of which were secured. The nest was placed among the rocks about 50 feet from their summit and more than 100 feet from their base. It was composed of sticks, seaweed, and mosses, was about 2 feet in diameter, and almost flat. Its edges were strewed with the remains of their food, and beneath the nest was an accumulation of the wings of the Ptarmigan, Mormons, Uriæ, etc., mingled with large pellets of fur, bones, and various substances."[1]

Four eggs seem to be the number usually laid by this Falcon, and they are deposited about the middle of May. The shells of these eggs are roughly granulated and without luster. In shape they are ovate, and apparently indistinguishable from those of the preceding subspecies; the set under consideration, and the only one in the U. S. National Museum collection, is a trifle lighter colored.

The ground color is a creamy white nearly hidden by fine irregular markings of light reddish or rusty brown. Three of the specimens are thus marked; in the fourth and lightest colored one these markings are more of a clay color, with scarcely a trace of red. They all differ slightly in color from each other.

The measurement of these eggs is as follows: 58 by 45.5, 58 by 44.5, 57.5 by 45, and 57 by 45.5 millimetres.

The type specimen, No. 22389 (Pl. 10, Fig. 1), was collected near Fort Chimo, Labrador, May 22, 1883, by Mr. L. M. Turner, U. S. Signal Service.

## 97. Falco mexicanus Schlegel.

PRAIRIE FALCON.

*Falco mexicanus* Schlegel, Abhandlungen aus dem Gebiete der Zoölogie, 1841, 15. (B 10, C 342, R 413, C 502, U 355.)

Geographical range: Western United States, from eastern border of the Great Plains to the Pacific, south into Mexico; casual eastward to Illinois.

The breeding range of the Prairie or Lanner Falcon includes the more open country from eastern Texas in the vicinity of Houston, where Nehrling reports it as resident but not common, north through the Indian Territory, Kansas, northwestern Missouri, and Nebraska to South and North Dakota, which seems to form the northern limit of its breeding range, as far as known at present. Prof. J. Macoun has taken it at Rush Lake, Northwest Territory, in latitude 51°, and it probably occurs and breeds in small numbers along the southern border of the Dominion of Canada from western Manitoba to southern British Columbia. From the Dakotas it reaches westward through the intervening States, excepting the densely timbered and higher mountain regions, to the

[1] History North American Birds, 1874, Vol. III, p. 121.

Pacific coast, where it seems to be fairly common in suitable localities throughout Washington, Oregon, and California. I have no doubt that it crosses our border into British Columbia, as I have found them breeding not uncommonly on the Upper Columbia River, close to the boundary line. South it extends through Arizona, New Mexico, Lower California, and northwestern Texas into Mexico. It seems to be equally and possibly more abundant in the central portions of its range, including portions of Colorado, Wyoming, Montana, Utah, Nevada, and Idaho.

It breeds in all the localities mentioned, but is only a summer resident in the northern portions of its range, wintering east of the Rocky Mountains from about latitude 37° southward. On the Pacific coast some of these Falcons at least remain throughout the winter as far north as latitude 45° 30′, where I have met with them at Fort Walla Walla, Washington, and also shot an adult male on February 19, 1885, at Fort Custer, Montana, while the weather was still intensely cold.

Though on the whole perhaps more of a prairie-loving species, this Falcon does not confine itself exclusively to open country, but inhabits and breeds in the lower mountains as well; sometimes even where heavily timbered. I have repeatedly seen them during the breeding season in the Blue Mountains, near Camp Harney, as well as in the Cascade Range, near Fort Klamath, Oregon, where they nested in some of the numerous cañons, and on inaccessible cliffs abounding in these regions.

In the latter part of May, 1879, while ascending the Upper Columbia River in a steamer from Wallula to Priest's Rapids, Washington, which was then the head of navigation, I noticed a nest of this Falcon in a small cavity of a chalk bluff, rising perpendicularly for about 120 feet directly out of the water. The nesting site was nearly midway up the bluff (called White Bluff), and as the main channel ran along the foot of it, I had rather a good opportunity to examine it closely.

In those days steamers seldom ascended the river so far, and the surrounding country was almost uninhabited, excepting here and there by small roving bands of Indians. As we approached the bluff both the old Falcons circled around above the nest, screaming loudly in a high key. Their alarm note was a rapidly repeated "kéé, kéé, kéé," and a sort of cackle. Standing on the upper deck of the boat I could see the young plainly; there were certainly four and possibly five of them, and they appeared to be sitting on the bare ground. I saw but little nesting material lying about the outer edge of the cavity, and this seemed to me to look more like scraps of refuse than anything else. The cavity was rather shallow and not much more than large enough to hold the young. The site was practically inaccessible, excepting by rope from above. The surrounding country was utterly devoid of trees and consisted of open grass and sagebrush-covered table-lands.

Landing at the foot of Priest's Rapids, the journey was continued to Wenatchee on horseback along the north side, and from there on the south

side of the Columbia to a point opposite the mouth of the Okinakane, following the shores of the former wherever practicable. On this march I saw several more of their nests, all in similar locations on small projecting ledges of perpendicular cliffs, most of them at a considerable height from the ground and nearly all practically inaccessible, unless one was provided with strong ropes and lowered from above. As the season was too far advanced I did not attempt to examine any of these nests for eggs. These Falcons seemed to be common enough throughout the entire region traveled over, and were about the only Raptores seen in this, for the most part, scantily timbered country.

At Fort Walla Walla, Washington, I noticed the Prairie Falcon more often in the late summer and fall, a few during the winter, and again in the spring on the return from their migrations. Without especially looking for them, I usually obtained half a dozen specimens each season, young birds greatly predominating.

While here they fed principally on Brewer's Blackbirds (*Scolecophagus cyanocephalus*), which always congregated in large flocks about the cavalry stables, except during the breeding season, and were constantly harassed by this Falcon, and also, but to a less extent, by the Pigeon Hawk and the Black and Richardson's Merlins.

The dead top of one of the largest cottonwood trees growing on the banks of the little creek flowing past the garrison was selected as a favorite perch by nearly all these birds, and fully three-fourths of the specimens obtained were killed from it. As affording them the best outlook over the surrounding country it was no doubt selected on that account. Most of their hunting was done early in the morning and again about an hour before sunset. Mourning Doves, Western Meadow Larks, and a domestic Pigeon furnished them now and then with a meal, and I have also found the remains of a Columbian Sharp-tailed Grouse in the crop of one specimen. Poultry was rarely molested; and although one of these Falcons would sometimes make a dash at some of the fowls, it seemed to me that it was done more to scare and to see them run than to capture them. Not a single instance came under my observation where a chicken was actually struck by one of them. I have no doubt whatever that they are fully capable of killing a full-grown hen and of carrying her off, but they do not seem to care for poultry, and I have more than once seen chickens feeding under a tree in which one of these birds was sitting.

On the plains where hares are abundant they are said to live partly on them, and, should other food be scarce, no doubt some of the various species of rodents found in such localities are also captured. In the vicinity of Walla Walla they subsisted almost entirely on such birds as mentioned.

They are strong and powerful for their size, very tenacious of life, and ugly customers to handle when wounded, invariably throwing themselves on their backs and fiercely striking out with their sharp talons. Their flight is

easy and gracefully accomplished by rapid wing beats and alternate sailing, and when once launched after the selected victim they are as swift as an arrow.

I believe that the Prairie Falcon nests almost invariably on rocky cliffs or perpendicular bluffs, on ledges or in small cavities in the same, and but rarely in other situations. Col. N. S. Goss, however, in his "Birds of Kansas," mentions that two eggs of this species now in his brother's collection, were taken April 28, 1880, at Marysville, Missouri, from a tree, the nest being 35 feet from the ground; it was not stated whether the nest was an open one in the forks of branches, or in a hole of the tree, but doubtless the latter. Mr. Walter E. Bryant, of San Francisco, California, who has taken a number of sets of eggs of this species, found them invariably on cliffs from 30 to 100 feet from the bottom. A handsome set of five eggs, which he kindly presented to the writer, was taken on March 25, 1882, at Pine Cañon, near Mount Diablo, California, and were fresh when found; they were laid in a cavity of a cliff about 4 feet in depth on some sand and bits of fur, feathers, etc., ejected by the birds, there being no nest. The cliff was about 100 feet high and perpendicular, and the site about 30 feet from its base.

Sets of eggs of the Prairie Falcon now in the U. S. National Museum collection, from near Gilmer, and others from the Wind River Mountains, Wyoming, as well as from Battle Mountain, Nevada, were all taken in similar situations. The first eggs of this species brought to the attention of naturalists were a set of three taken on Gros Ventre River, in the Wind River Mountains, by Dr. F. V. Hayden, on June 8, 1860.

Mr. Walter E. Bryant also found a pair of these Falcons nesting in a high cliff near San Esteban, Lower California, on April 18, 1889. The earliest date on which he took full sets of eggs of this species in California was March 24, 1881, and fresh eggs were taken by him as late as April 7. These dates are probably as early as they nest anywhere within their range. Farther north nidification is protracted through April and the beginning of May, and occasionally even into the first week in June. As a rule there is but little of a nest, if any, the eggs being usually laid on the bare rock, among some of the refuse carried there as food, such as bones, bits of fur, and feathers.

The eggs number from three to five, sets of five seeming to be the usual number found on the Pacific coast, while in the interior sets of three or four are perhaps more common. Occasionally but two eggs have been found, but it is doubtful if such so-called sets were complete when taken. Should they lose their first clutch of eggs a second and smaller one is sometimes laid. The eggs are deposited at intervals of a day or two, and nidification lasts probably from three to four weeks. The young when first hatched are covered with a thick white fluffy down, and they grow rapidly. As soon as they are fully grown and able to care for themselves they are turned adrift to make their own living, and fall easy victims to the guns

of collectors. The old birds are shy and wary, and much harder to bring to bag. If the eggs are near the point of hatching, or if there are young in the nest, the parents will occasionally defend them, showing at times considerable courage.

The majority of the eggs of the Prairie Falcon in the U. S. National Museum collection are lighter colored than those of any other Falcons found on the North American continent, excepting the eggs of the Sparrow Hawk. The ground color is creamy white, and easily visible in a majority of the specimens before me. In a few, however, this is entirely obscured by the overlying pigment, giving the egg a vinaceous cinnamon color, and in others a dirty clay color. They are blotched and spotted with different shades of reddish brown, tawny, and chocolate. As a rule these markings are pretty evenly distributed over the entire egg; only in an occasional specimen are they heaviest on one end, and in such cases usually confluent. The average measurement of fourteen specimens in the U. S. National Museum collection is 53 by 41.5 millimetres, the largest egg measuring 56 by 41, the smallest 52 by 40 millimetres.

The type specimens No. 15596 (Pl. 10, Fig. 2), selected from a set of five, representing one of the heavier marked eggs, was taken by Mr. H. R. Durkee, near Gilmer, Wyoming, May 13, 1870, and No. 20664, from the Bendire collection (Pl. 10, Fig. 3), also from a set of five, was taken in Pine Cañon, Mount Diablo, California, by Mr. H. E. Bryant, March 25, 1882. This is one of the more sparingly marked specimens in the collection.

## 98. Falco peregrinus anatum (Bonaparte).

DUCK HAWK.

*Falco anatum* Bonaparte, Geographical and Comparative List, 1838, 4.
*Falco peregrinus β anatum* Blasius, List of the Birds of Europe, 1862, 3.
(B 5, 6, C 343, R 414, C 503, U 356.)

Geographical range: Whole of America, south as far at least as Chile; eastern Asia.?

The breeding range of the Duck Hawk, or Peregrine Falcon, includes the greater portion of the United States and the Dominion of Canada, excepting perhaps the extreme southern portions of our domain, such as Florida and the cotton States bordering on the Gulf coast, where it appears to be a winter visitor only. It nests sparingly in suitable localities throughout the thinly settled mountainous portions of South Carolina from about latitude 35° N., northward, and generally among the more or less inaccessible cliffs found near the shores of the larger mountain streams and lakes of the Atlantic watershed. In the middle and western prairie regions, where there are no suitable cliffs, it nests in hollows of trees in the heavily timbered bottom lands. Throughout the Rocky Mountains, north to the shores of

the Arctic Sea, as well as near the numerous lakes of the Great Basin, and westward over the entire Pacific coast from Lower and southern California northward to Oregon and Washington, it seems to be more abundant than east of the Mississippi River, and breeds throughout the entire range indicated. While it cannot be considered a common species anywhere, still it is the most numerous of our larger Falcons.

In the northern portions of its range it is only a summer resident, following the immense flocks of waterfowl during their migrations, on which it principally subsists. Hares, Ptarmigan, Grouse, Bob Whites, Pigeons, as well as smaller birds, enter largely into its bill of fare, and the poultry yard as well occasionally suffers. Next to the Goshawk the Peregrine Falcon is our most audacious bird of prey. Its flight, when once fairly started in pursuit of its quarry, is amazingly swift; it is seemingly an easy matter for it to overtake even the fleetest of birds, and when once in its grasp resistance is useless. I have seen this Falcon strike a Cinnamon Teal (*Anas cyanoptera*) almost within gunshot of me, kill it apparently instantly from the force of the shock, and fly away with it as easily, and without visible struggle, as if it had been a Sparrow instead of a bird of its own weight.

Within recent years quite a number of the nests of this species have been taken in the New England States and other localities in the North, records of these captures being noted in various ornithological publications. In a letter now before me, written December 18, 1887, Dr. John W. Detwiller, of Bethlehem, Pennsylvania, states: "It may interest you to know that the Duck Hawk breeds abundantly in this State. I found a nest containing four eggs on a cliff on the west shore of the Delaware River, 12 miles below Easton, Pennsylvania; and about four weeks later a second containing two eggs slightly incubated, which doubtless belonged to the same birds." In the same letter several other localities are mentioned along the Susquehanna River from which the doctor has taken full sets of eggs of this species, and the bird is evidently not uncommon there. From the observations of Mr. L. M. Loomis "On the Summer Birds of Pickens County, South Carolina," in the Auk (Vol. VII, 1890, p. 37), there is little reason to doubt that these birds had a nest with young there, and if other suitable mountain regions throughout North Carolina, the Virginias, northern Alabama, Georgia, Tennessee, and Kentucky were equally well examined the Duck Hawk would be found breeding there, too.

Mr. Robert Ridgway, of the Smithsonian Institution, found the Duck Hawk not at all rare in the heavy timber of the river bottoms in the vicinity of Mount Carmel, Illinois. Not less than three nests were found in the immediate vicinity of town, all placed in cavities in the tops of very large sycamore trees, and inaccessible. One of these trees was felled and four fully feathered young were taken from the nest.[1] Col. N. S. Goss also found the Duck Hawk nesting in trees near Neosho Falls, in southeastern Kansas,

[1] Bulletin Nuttall Ornithological Club, Vol. III, 1878, pp. 165, 166.

a pair occupying a trough-like cavity in a large sycamore about 50 feet from the ground. The nest contained three fresh eggs on March 27, 1875, which were laid on the fine, soft rotten wood in a hollow, worked out of the same to fit the body of the bird. There was no other material or lining except a few feathers and down mixed with the decayed wood. On March 17, 1876, a pair were found nesting on the opposite side of the river from the above described nest, in a cottonwood at least 60 feet from the ground, the birds entering a knot hole in the tree apparently not over 5 or 6 inches in diameter. The tree was very straight and without limbs up to the nest, and this was out of reach. The birds were very noisy, but shy. On April 30, 1877, he found another pair about 4 miles farther up the river, breeding in a broken hollow limb of a giant sycamore, and from the actions of the birds he thought they had young.

Colonel Goss further states: "The males, so far as noticed, sit upon the eggs in the fore part of the day, and the females during the latter part; each, while off duty, occasionally feeding the other, but putting in a good share of the time as sentinels, perched upon a favorite dead limb near the nest, ready to give the alarm in case of approaching danger. At such times they scold rapidly and manifest great anxiety and fear, circling overhead, occasionally alighting, but taking good care to keep out of reach. Their fear of man is not without cause, for our hunters never lose an opportunity to shoot at them, knowing how destructive they are to the waterfowl found in the sloughs along the river bottoms."[1]

In Cleburne County, Arkansas, it nests in the sandstone bluffs along the Little Red River. Mr. B. T. Gault noticed them in such locations there in the spring of 1888, and Mr. O. Widmann informed him that they also nested quite abundantly in the rocky bluffs and ledges along the Mississippi River, a few miles south of St. Louis, Missouri.

In Montana, Dr. James C. Merrill, U. S. Army, says they are quite common along the Missouri and Yellowstone Rivers, near cliffs or cut banks, where their nests were placed, sometimes in a cavity in some rock high above the river, and then, again, on a shelf or projection of a clay bank, so low that he could see the contents of the nest from the upper deck of the steamer. Their abundance on the Upper Missouri is further confirmed by Mr. R. S. Williams, who writes me: "Quite a number of these birds breed in the high sandstone cliffs above the Falls of the Missouri. I found a nest containing two birds just hatched and two eggs, on June 5, 1885. The nest was situated in a small hollow in a perpendicular wall of rock, some 15 or 20 feet above the base of the wall, and consisted of a few coarse twigs and bits of grass, forming a ridge on the outer side barely sufficient to prevent the eggs from rolling out. The parents were both about and quite bold, dashing back and forth overhead and keeping up a constant succession of noisy screams as long as I was near."

[1] Bulletin Nuttall Ornithological Club, Vol. III, 1878, pp. 32-34.

A nest taken by me on April 24, 1877, from a small cavity in a basaltic cliff, 30 miles south of Camp Harney, Oregon, and about 3 miles from the eastern end of Malheur Lake, contained three slightly incubated eggs. They were lying on the bare rock, with a little rubbish and a few small bones placed around them to keep them from rolling out. The site was about 25 feet from the ground and about 10 feet from the top of the cliff. The female was very bold and was easily shot. Another set collected for me a few miles south of San Diego, California, on March 29, 1873, was placed in a similar situation, a basaltic cliff on the seashore. It contained three fresh eggs.

Occasionally the Duck Hawk will use the nest of another species to lay in, but such instances seem rare. Mr. Denis Gale took a very handsome set of eggs from an old Eagle's nest on April 30, 1889, which he generously donated to the U. S. National Museum collection. He writes me: "I discovered this nesting site first on April 4, 1889, in a ledge of rocks on the Cache la Poudre Creek. Some difficulty was experienced in getting to the nest, and no eggs were found on that occasion, it being too early. Nevertheless the birds were a good deal excited and flew around overhead, yet it might only have been caused by seeing their favorite hunting ground invaded. I think if they had eggs to guard at that time, the watching I bestowed upon them with my glass would have located the site exactly, but it did not. Probably it was when nearest to their nesting site, that the female flew overhead and cackled like a two-thirds grown duckling. This was unmistakable, and a peculiarity I never before met with.

"On the 24th the nest contained two eggs, which were left till the 30th. The site was in a rocky ledge about 80 feet high and about 50 feet from the foot of the cliff. The nest was reached by climbing down a rope from above. On April 30, six days later, four eggs were found in the nest and taken. They were all perfectly fresh. I do not think that the set was complete, and believe that another would have been added a day or two later."

The Duck Hawk must be fairly common in the Arctic regions and the interior of Alaska, as attested by a number of sets of eggs, now in the U. S. National Museum collection, taken by Mr. R. MacFarlane, on the Lockhart and Anderson Rivers; by Mr. S. Jones, at Fort Rae, Great Slave Lake, and Fort Yukon, Alaska; and by Mr. James Lockhart, at Fort Resolution and other localities. They usually nested on sandstone and clay banks along the rivers and numerous lakes of that region.

Mr. L. M. Turner found the Duck Hawk quite common near Fort Chimo, Labrador, in 1883 and 1884, and he took several sets of their eggs. He states: "Scarcely an island of large size but what has one or more pairs of these Hawks breeding on them. Those islands which are in the vicinity of the localities selected by Eider Ducks, Gulls, and other water birds, are the ones also chosen by these Hawks for breeding purposes, if a suitable ledge on a cliff can be found. * * *

"At the southern end of a cliff on Hunting Bay a pair of this species

were building their nest; some 70 yards from it was the nest of the Black Rough-legged Hawk (*Archibuteo lagopus sancti-johannis*), while some 300 yards to the north was the nest of a Raven (*Corvus corax sinuatus*), and near it the beginning of the nest of the Labrador Falcon (*Falco rusticolus obsoletus*). Just beneath the latter were the deserted nests of the preceding year of the White-bellied Swallow (*Tachycineta bicolor*)."

Several eggs of this species from Greenland, where it is not uncommon, are also in the U. S. National Museum collection. I think the Duck Hawk remains paired during life, and that when a nesting site is once selected it is usually resorted to from year to year, even should the eggs be taken regularly each season. They appear very much attached to certain localities, and if persistent persecution during the nesting season should cause them to abandon the original site they nearly always select another on the same cliff, or if one cannot be found there, as near to it as possible. A site once selected is valiantly defended against interlopers, and as a rule no other pair of Hawks is allowed to nest in close proximity to it. Each pair seems also to have its proper hunting range during the season of reproduction, and any infringement on this is stoutly resisted. At other seasons they are usually seen alone, and they are at all times rather a silent bird, excepting when their homes are invaded; then they are noisy enough, and give vent to loud screams and cacklings.

Nidification in the southern and middle portions of its range begins in the latter half of March, in New York and the New England States usually about the beginning of April, in Colorado, Montana, and Oregon about the latter half of April, and correspondingly later in Labrador and the Arctic regions, where eggs have been taken throughout the month of June, and a set of four at Fort Chimo, Ungava, as late as July 6, 1884. But a single brood is raised in a season. Incubation lasts about four weeks and both parents assist in this duty. The eggs are usually four in number, occasionally but three, and very rarely five. These are deposited at intervals of two or more days, and generally laid on the bare rock or soil, if the eyrie is on a cliff or clay bank. The Duck Hawk can scarcely be said to build a nest, and if there is occasionally a semblance of one, it is but very slight. Sites in hollow trees are only used when cliffs or suitable bluffs are wanting, and old nests of other Raptores are still more rarely resorted to.

The eggs of the Duck Hawk vary considerably in shape as well as in coloration. The most common forms are short and rounded ovate, and occasionally a specimen is distinctly elliptical ovate.

The ground color when visible, which is not often the case, is pale creamy or yellowish white; in some specimens this is evenly overlaid with coloring matter, giving it a light chocolate colored appearance, in others it approaches a pale yellowish brown, and in one it is a decided fawn color. The eggs are irregularly blotched, streaked, smeared, and spotted with various shades of claret brown, vinaceous rufous, and brick red. In some the

markings are well defined, in others confluent, giving them a clouded appearance; the majority are pretty evenly marked throughout, in a few they are more heavily spotted on one of the ends. Compared with the eggs of other Falcons they are decidedly darker colored, resembling the heavier marked and darker specimens of the eggs of Audubon's Caracara (*Polyborus cheriway*).

The average measurement of sixty-one specimens in the U. S. National Museum collection is 52.5 by 41 millimetres. The largest of these eggs measures 57 by 43, the smallest 48.5 by 38.5, and a runt egg but 38.5 by 30 millimetres.

Of the type specimens selected to show some of the styles of coloration, No. 6191 (Pl. 10, Fig. 5), a single egg, was collected by Mr. James Lockhart, near Fort Yukon, Alaska, in June, 1863; No. 10181 (Pl. 10, Fig. 6), by Mr. R. MacFarlane, on the Lockhart River, Arctic America, June 5, 1866, from a set of four; and No. 23890 (Pl. 10, Fig. 7), by Mr. Denis Gale, on Cache la Poudre Creek, Colorado, April 30, 1889, likewise from a set of four.

## 99. Falco peregrinus pealei Ridgway.

PEALE'S FALCON.

*Falco communis* var. *pealei* Ridgway, Bulletin Essex Institute, v, December, 1873, 201.
*Falco peregrinus pealei* Ridgway, Proceedings U. S. National Museum, iii, August 24, 1880, 192.

(B —, C 343*a*, R 414*a*, C 504, U 356*a*.)

Geographical range: Pacific coast region of North America, from Oregon north to the Aleutian and west to the Commander Islands.

This dark colored race of the Duck Hawk, Peale's Falcon, seems to be a fairly common resident of the Aleutian as well as the Commander Islands.

Mr. W. H. Dall, U. S. Coast Survey, in his "Notes on the Avifauna of the Aleutian Islands," especially those west of Unalaska Island, published in the Proceedings of the California Academy of Sciences, 1874, p. 3, speaks of this subspecies, under the name of *Falco gyrfalco* Linn., as follows: "A male was obtained in the harbor of Kyska, June 30, 1873, being one of several which had their nests on the brow of a precipitous and inaccessible cliff at the west end of the harbor, perhaps 150 feet above the water. The same species was observed flying over the low island of Amchitka a little later in the season. It does not appear to be common, but was the only Hawk observed in the islands west of Unalaska. It appeared to pass most of its time near the nest and raised a loud outcry when anyone approached the base of the cliff on the beach below. The fragments of several Ptarmigan, probably remnants from some of its meals, were noticed at the foot of the bluff below the nest."

Mr. L. M. Turner, in speaking of this Falcon, says: "Peale's Falcon was frequently observed on Amchitka Island in the month of June, 1881, and on

several occasions on Attu Island during 1880 and 1881. It breeds on nearly all the islands of the chain and is a winter resident on the nearer group, at least. On Agattu it is reported to be very common, and on Amchitka I knew of three nests on the ledges of the high bluffs hanging over the sea. Any approach to the cliffs was heralded by the bird darting from the nest and circling high in the air, screaming fiercely all the while, and any attempt to shoot the birds while flying over the water would have resulted in the loss of the specimen, for they always flew in front of the cliffs out of range.

"At Attu Island I frequently saw one of these birds join the Ravens when the latter were performing their aërial gymnastics on the approach of a gale. The Hawk endeavored to imitate the Ravens, which paid but little attention to the antics of the intruder. At Attu this Hawk is not common, though the natives assert that it is common enough at Agattu and the Semichi Islands, and they told me that where this Hawk breeds there will also be found the nests of the Eiders. I could not believe this until a short stay at Amicha Island forced me to recognize it as a fact; for in each instance the Eiders were very abundant in every locality where the nest of this Hawk was known to be. It is quite probable that the Hawk selects the place with special reference to prospective young Eiders."[1]

Nothing is as yet known about the eggs of Peale's Falcon, but they are doubtless indistinguishable, both in size and color, from those of the preceding subspecies. It appears to nest in localities similar to those of the latter when breeding on the seacoast.

## 100. Falco columbarius Linnæus.

PIGEON HAWK.

*Falco columbarius* Linnæus, Systema Naturæ, ed. 10, I, 1758, 90.
(B 7, C 344, R 417, C 505, U 357.)

Geographical range: The whole of North America; south in winter to the West Indies, middle America, and northern South America.

Although the well known Pigeon Hawk is pretty generally distributed over the entire United States during the fall and winter seasons, by far the greater number breed north of our border, and comparatively few remain as summer residents, at least east of the Mississippi River, and those that do, generally confine themselves to the mountain districts and to the thinly settled and heavily wooded regions along our Northern States. In the Rocky Mountains, as well as in the Sierra Nevada and Cascade Ranges, and their spurs, the Pigeon Hawk is probably quite a common summer resident, but as yet its nest and eggs have been rarely taken, and even where they have been found, there remains more or less doubt as to their proper identification, as the two closely allied forms, *Falco columbarius suckleyi* and

[1] Contributions to the Natural History of Alaska, 1886, p. 160.

*Falco richardsonii*, occur in some of these mountains as well, and are very liable to be mistaken for the true Pigeon Hawk, even by fairly well posted ornithologists, and almost certainly by the average collector. Unless the parent is secured with the eggs the latter cannot be identified with any certainty. Its range northward is quite extended, reaching north of latitude 68° in the interior of British North America to Norton Sound and to the shores of Bering Sea, in Alaska.

In the eastern United States the Pigeon Hawk has been occasionally observed during the breeding season in Maine, Vermont, New Hampshire, and the northern parts of New York and Pennsylvania. It has likewise been noticed at this time in Michigan, Iowa, Wisconsin, and Minnesota, and doubtless breeds here also, as well as in the mountainous portions of some of the Southern States.

Mr. William Brewster records the finding of a nest and four eggs on Amherst Island, in the Gulf of St. Lawrence, on June 9, 1882, by Mr. Frazar, who while passing a spruce-clad knoll, surrounded by a boggy swamp, noticed a pair of Pigeon Hawks circling above the trees, and approaching quickly, discovered the nest built in a dense spruce at the intersection of a horizontal branch with the main stem, and at a height of about 10 feet. As he climbed the tree the Hawks, now thoroughly alarmed for the safety of their home, dashed wildly about his head, frequently passing within a few feet and uttering shrill screams of anger and dismay. After taking the eggs he made a close examination of the nest, which was found to be very bulky, in fact "as large as a Crow's," and composed chiefly of bark, with some coarse sticks surrounding the exterior, and a neat soft lining of finer bark and horse hair. From its general appearance he felt convinced that it was constructed by the Hawks themselves. This was June 9; returning five days later he found both birds flying about the knoll, and their actions indicated that they had built another nest somewhere near, but it could not be found. As he was then on the point of leaving the island he shot the male, a fine adult specimen, which accompanies the eggs.[1]

Mr. Lynds Jones writes me that he found a nest of this species near Grinnell, Iowa, on April 28, containing four eggs. They were placed in a hole in an American linden tree about 8 feet from the ground. The nest was made of dry grasses, fibrous bark, and a few feathers. The birds hovered near when the nest was disturbed, but did not offer any resistance. Mr. J. W. Preston, of Baxter, Iowa, informs me that a pair of these birds remained one season near Iowa City under circumstances which led him to believe they were nesting. Mr. Charles D. Gibson states that the Pigeon Hawk is a resident of the Maryland and Delaware Peninsula, and that it breeds in both localities. I have tried to verify this record, but was unsuccessful.[2]

Mr. Audubon found three nests of this bird in Labrador, each containing five eggs. These nests were placed on the top branches of the low firs so

[1] Bulletin Nuttall Ornithological Club, Vol. VII, 1882, No. 4, p. 255.
[2] Ornithologist and Oölogist, Vol. VIII, September, 1883, No. 9, page 72.

common in that country, composed of sticks, and slightly lined with moss and a few feathers.[1]

Mr. L. M. Turner observed a few of these birds in the vicinity of Fort Chimo, Labrador, in 1882 and 1883, but failed to find their nests or eggs.

Mr. R. H. Taylor describes a nest of the Pigeon Hawk taken by himself on April 6, 1888, in Santa Clara County, California. He says: "I first saw the nest late in May one year ago, when it contained three young birds ready to fly. It was located on a steep mountain side on the stock ranch of Mr. J. P. Sargent, in the above named county, on a ledge of a precipitous bluff about 35 feet high. While near the nest last year the old bird was astonishingly fearless and would swoop down close to my head, uttering ear-piercing cries. These angry demonstrations, while they made me somewhat apprehensive of damaged eyes, afforded an excellent opportunity for jotting down a description of this Falcon.

"When I visited the nest this season the bird flew off as I came up and winged its peculiar flight across the cañon, when it settled quietly on a hillside. My friend Mr. R. C. Sargent, adjusted the end of a rawhide lariat to my body, and as soon as the rope had been placed around a small shrub which grew above, I swung over the ledge and was slowly lowered toward the nest, and as it was rather in from the face of the cliff I found it difficult to get a foothold, but, when I did at last, saw that it was composed simply of pieces of friable rock, and in it, to my delighted surprise, were five eggs, which contained large embroyos."[2]

While I was stationed at Camp Harney, Oregon, a woodchopper working in the lower foothills of the Blue Mountains, about 5 miles from the post, found a nest, probably belonging to this species, on April 20, 1876. It contained five well incubated eggs, three of which he broke before I received them from him, nearly a week after they were first taken. I made him show me the nest at once in the hope that the parents might still be found in the vicinity, but a lengthy and careful search failed to discover them. The two eggs left are indistinguishable, both in size and markings, from fully identified specimens of this species; still they are just as likely to belong to Richardson's Merlin (*Falco richardsonii*), which is also found there and apparently equally abundant. The nest, evidently built by the birds themselves, was placed in a young spruce tree about 25 feet up, and close to the trunk. It was well concealed and the woodchopper's attention was drawn to it by the uneasiness of the birds while he was working in the vicinity. The nest appeared to me considerably smaller than a Crow's nest and was loosely constructed of small fir and juniper twigs, and slightly lined with dry juniper bark and a little moss.

With but few exceptions, nearly all the eggs of this species in the U. S. National Museum collection were obtained north of the United States. Mr. R. MacFarlane, who took several of their nests, says: "This Falcon ranges

[1] History of North American Birds, 1874, Vol. III, p. 152.

[2] Ornithologist and Oölogist, Vol. XIII, December, 1888, No. 12, p. 185.

along the Anderson River to near the Arctic coast of Liverpool Bay. Several of their nests had apparently been built on pine trees and others on ledges of shaly cliffs. The former were composed externally of a few dry willow twigs and internally of withered hay or grasses, etc.; and the latter had only a very few decayed leaves under the eggs. In one instance the oviduct of a female contained an egg almost ready for extrusion; it was colored like the others, but the pigment was still so soft that it adhered to the fingers on being touched. * * * Other specimens taken from the oviduct were perfectly white.

"I would also mention the following interesting circumstance: On May 25, 1864, a trusty Indian in my employ found a nest placed in the midst of a thick branch of a pine tree at a height of about 6 feet from the ground. It was rather loosely constructed of a few dry sticks and a small quantity of coarse hay; it then contained two eggs; both parents were seen, fired at, and missed. On the 31st he revisited the nest, which still held but two eggs, and again missed the birds. Several days later he made another visit thereto, and, to his surprise, the eggs and parents had disappeared. His first impression was that some other person had taken them; after looking carefully around he perceived both birds at a short distance, and this led him to institute a search which soon resulted in finding that the eggs must have been removed by the parent birds to the face of a muddy bank at least 40 yards distant from the original nest. A few decayed leaves had been placed under them, but nothing else in the way of lining. A third egg had been added in the interim. There can hardly be any doubt of the truth of the foregoing facts."[1]

Mr. J. Sibbiston took a nest and eggs at Fort Yukon, Alaska, in June, 1864; Messrs. Robert Kennicott and Alexander McKenzie, each one, at Fort Resolution, Great Slave Lake, on June 6, 1860, and Mr. A. Flett, one at Fort Peele, Arctic North America, in June, 1863. In all these cases the parent was taken and sent on with the eggs.

Dr. R. B. Hitz took two fresh eggs at Sun River, Montana, on July 5, 1867, but failed to secure the parents. The nest was in the hollow of a tree about 20 feet from the ground.

From the foregoing accounts it will be seen that the Pigeon Hawk breeds in open nests and in natural hollows of trees as well as on cliffs and in cavities and projections of river bluffs. Its flight is swift and powerful, resembling that of the larger Falcons During the breeding season these birds are rather retiring and are seldom noticed unless their nesting site is very closely approached; but in the early fall and spring, as well as during the winter, excepting along our northern border, they are not at all uncommon, especially during their migrations. I found them moderately abundant in Oregon, Washington, and Idaho, and have no doubt that they regularly breed in the mountains there, but the majority go farther north.

[1] R. MacFarlane's Manuscript Notes on the Land and Water Birds Nesting in British America.

Their food to a great extent consists of small birds, and no hesitation is shown in attacking one fully as large or even larger than themselves. In the summer grasshoppers and crickets, as well as other insects, furnish a considerable portion of their daily fare.

In the southern portions of their range nidification begins probably about the end of March or the first week in April, and correspondingly later farther north. In central Alaska and the Anderson River country it is protracted till the latter part of May or the beginning of June, and occasionally even later. Incubation probably lasts about three weeks, and but a single brood is raised in a season. The eggs are generally four or five in number, and these vary considerably in shape; some are short ovate, others rounded ovate, some nearer oval, and a few specimens elliptical ovate. The shell of the egg is close grained, and without luster. The ground color when visible is pale creamy white as a rule, and is hidden by a reddish brown suffusion of various degrees of intensity, and this, again, is finely marked or boldly blotched, with different shades of burnt umber, claret brown and vinaceous rufous. These markings are generally equally and profusely distributed over the entire egg, and are superficial; occasionally they are most distinct about one of the ends, being disposed in the shape of a wreath. Compared with the eggs of other Falcons, they resemble those of the Duck Hawk (*Falco peregrinus anatum*) closer than any others as far as coloration is concerned.

The average measurement of twenty-seven specimens in the U. S. National Museum collection, is 40.5 by 31.5 millimetres. The largest egg of the series, from Fort Yukon, Alaska, measures 44.5 by 33, the smallest 37.5 by 33 millimetres.

Of the type specimens, No. 6192 (Pl. 10, Fig. 8), from an incomplete set of two eggs, was taken June 6, 1860, near Fort Resolution, Great Slave Lake, by Mr. Alexander McKenzie, and No. 8808 (Pl. 10, Fig. 4), from a set of four eggs, was collected by Mr. R. McFarlane at Anderson River Fort, Arctic North America, in June, 1863.

### 101. Falco columbarius suckleyi Ridgway.

BLACK MERLIN.

*Falco columbarius* var. *suckleyi* Ridgway, Bulletin Essex Institute, v, December, 1873, 201.

(B —, C 344*a*, R 417*a*, C 506, U 357*a*.)

Geographical range: Northwest coast region from California to Sitka, Alaska; east to eastern Washington and Oregon.

Scarcely anything is known about the breeding habits of this the darkest colored and handsomest of our Merlins. Its range probably includes the mountain regions from northern California to Alaska, along the coast; and in the interior it is found in southern Oregon (Fort Klamath) and eastern Wash-

ington (Fort Walla Walla), in both of which localities I obtained specimens, but am not aware that its eggs have ever been taken. I am quite positive, however, that an occasional pair breeds in the vicinity of Fort Klamath. On May 9, 1883, while en route from this post to Linkville, Oregon, I observed a pair of these birds in the large open pine forest about midway between the two points. I had halted my party to let the horses graze, and, while resting, my attention was attracted to the male, by its incessant screaming in the trees overhead; this also brought the female around, and she was equally as noisy. It was clear that they had a nest in the vicinity, either in the tall pines or in a cliff about 400 yards distant, but a careful search instituted by the members of my party and myself failed to reveal it. Both birds were rather shy, but I finally succeeded in killing the male, a very handsome adult specimen. This is now in Mr. Manly Hardy's collection at Brewer, Maine, to whom I presented it. Where I observed Suckley's Merlin, it was much rarer than *Falco columbarius* at any time. At Fort Walla Walla, Washington, I obtained both subspecies as well as Richardson's Merlin; all of the specimens taken here, however, were shot during the migration, or in winter. It is probably common enough along the coast of Oregon, Washington, and British Columbia, and the mode of nidification as well as the eggs are not likely to differ from those of the preceding subspecies.

### 102. Falco richardsonii Ridgway.

RICHARDSON'S MERLIN.

*Falco* (*Hypotriorchis*) *richardsonii* Ridgway, Proceedings Academy Natural Sciences, Philadelphia, December, 1870, 145.
(B —, C 345, R 418, C 507, U 358.)

Geographical range: Interior and western plains of North America, from the Mississippi River to the Pacific coast; north to Saskatchewan, British America, south in winter to Texas and Arizona (and probably into Mexico).

Richardson's Merlin, a slightly larger and paler colored bird than the Pigeon Hawk and resembling very much the common European Merlin (*Falco regulus*), with which it was confounded by some of our earlier ornithologists, is another species about which little is known respecting its eggs, nests, and breeding range.

From an examination of the series of skins of the subgenus *Æsalon* in the U. S. National Museum collection, it plainly appears that the northern range of Richardson's Merlin is not nearly so extended as that of the common Pigeon Hawk. Among the numerous specimens received through the exertions of some of the gentlemen of the Hudson Bay Company from the Great Slave Lake, the Mackenzie and Anderson river region, there is not a single one referable to this species, and it is doubtful if it reaches a higher latitude than 55° in the interior, though on the Pacific coast it may possibly be found somewhat farther northward during the breeding season.

Dr. Elliott Coues, in speaking of this species, says: "Dr. Richardson's bird was an old female killed at Carlton House, on the Saskatchewan, May 14, 1827, while flying with her mate; in the oviduct there were several full-sized white eggs, clouded at one end with a few bronze colored spots."[1]

Carlton House is situated on the line of the Canadian Pacific Railroad, near latitude 53° N. Within our own limits, it seems to be most common along the timbered river bottoms of the Missouri and its tributaries and along the borders of the various streams having their sources in the Rocky Mountains from Colorado northward. It is known to breed near Fort Rice, Dakota, where young birds just out of the nest were obtained on July 10, 1867. Among the specimens in the U. S. National Museum collection are some from Colorado, Montana, Wyoming, the two Dakotas, the Indian Territory, and New Mexico; also from Washington, Oregon, and California, on the Pacific coast. I have taken several at Walla Walla, Washington, but do not believe that it breeds in the immediate vicinity of this place.

There are no absolutely identified eggs of Richardson's Merlin in the U. S. National Museum collection. Its mode of nidification and the eggs as well, are doubtless very similar to those of the common Pigeon Hawk, and indistinguishable from them, but may possibly average a trifle larger in size.

## 103. Falco regulus Pallas.

MERLIN.

*Falco regulus* Pallas, Reise, Russischen Reichs, II, Anhang, 1773, 707.
(B —, C —, R —, C —, U 358.1.)

Geographical range: Europe, Asia, and Africa; accidental on the coast of Greenland.

This little Falcon, one of the smallest found in Europe, breeds throughout the more northern portions of the Old World, and is entitled to a place in our avifauna, a specimen having been shot at Cape Farewell, Greenland, May 3, 1875, which is now in the collection of the Public Museum at Milwaukee, Wisconsin.

According to Mr. Henry Seebohm, "The Merlin breeds throughout north Europe, Iceland, and the Faroes, wintering in south Europe and north Africa, where, according to Loche, a few remain through the summer, retiring to the highest districts to breed. Eastward it breeds throughout northern Siberia, passing through Mongolia and Turkestan on migration, and wintering in south China, northwest India and Scinde."

Speaking of this species in Great Britain, he says: "The Merlin, in those districts frequented by it from North Derbyshire to the Shetlands, is a resident species, living on the moorlands and the mountains in summer, and retiring to

[1] Birds of the Northwest, 1874, p. 349.

more cultivated districts for the winter, in a manner similar to that of the Meadow Pipit. Even in the wild country of the Shetlands, the Western Isles, and the Highlands the Merlin is found throughout the year; in summer on the mountains and in winter lower down, in more sheltered districts on the seashore. * * *

"Although the Merlin arrives on the moorlands from its winter haunts late in March or early in April, it is a somewhat late breeder. The date of nidification is evidently chosen with relation to an abundant supply of food for the young. * * * The site selected for the nest varies in different localities; for in Lapland, both Wolley and Wheelwright mention instances of nests being found in trees, and Collett says that in south Norway it frequently takes possession of an old nest in a tree, like the Kestrel. On the Faroes it is said to breed on the cliffs. On our own moorlands a site is chosen on the ground, in the tall heather, or in some flat spot among the rocks on the steep slopes at the foot of the precipitous ridges so often met with in these localities. The site usually slopes down to a stream, and is one that commands a good view of the surrounding country. In most cases a small hole is made; whatever roots and dry grass may chance to be upon the spot are scratched into the rudiments of a nest, and the only materials actually selected by the bird appear to be a few slender twigs of 'ling' to form the outside of the structure, and which are generally broken from the heather overhanging the nest. When on the rocky slopes, it is usually made under a heather tuft, or beneath a mass of coarse herbage, and is then but a mere hollow in the scanty soil, as often without the ling twigs as with them.

"The eggs of the Merlin are usually five in number, sometimes only four; and are somewhat rounded in form. * * * Some specimens are deep reddish brown, so richly colored as to hide all trace of the ground color; others are pale red with most of the deep brown confined sometimes to the large and sometimes to the small end. Some specimens are pale cream in ground color, evenly and beautifully marbled with deep purplish red, or finely dusted over the entire surface with minute specks of blackish brown, and vary from 1.65 to 1.50 inches in length, and from 1.20 to 1.15 inches in breadth [equal to 41.9 to 38.1 in length, and 30.5 to 29.2 millimetres in breadth]."[1]

The eggs of the Merlin are scarcely distinguishable from those of the Pigeon Hawk. The average measurement of eight eggs in the U. S. National Museum collection is 39 by 31 millimetres. The largest egg measures 40 by 31.5, the smallest 38 by 31 millimetres.

[1] History of British Birds, 1883, Vol. I, pp. 34-39.

## 104. Falco fusco-cœrulescens Vieillot.

APLOMADO FALCON.

*Falco fusco-cœrulescens* Vieillot, Nouveau Dictionaire, xi, 1817, 90.
(B 9, C 347, R 419, C 511, U 359.)

Geographical range: Tropical America in general (except West Indies), north to southern Texas and the Territories of New Mexico and Arizona.

The breeding range of the handsome Aplomado Falcon, a common and widely distributed Central and South American species, as far as known at present, is along the southwestern border of the United States, through the valley of the Rio Grande from southern and southwestern Texas to southwestern New Mexico and southern Arizona. It has not as yet been met with in Lower California, and it is doubtful if it occurs there.

In its habits, compared with other Falcons, it is said to be rather spiritless and does not appear to possess the dash of the Pigeon Hawk or the Duck Hawk, between which it is intermediate in size.

Dr. James C. Merrill, U. S. Army, is the first naturalist who found it breeding within our borders. In his "Notes on Birds observed in the vicinity Fort Brown, Texas," he says: "During 1876 and 1877, I had occasionally seen a Hawk that I felt confident was of this species, but did not succeed in obtaining any specimens. On the 16th of June of the latter year, I found a nest placed in the top of a low Spanish bayonet, growing in Palo Alto prairie, about 7 miles from Fort Brown. After waiting a long time I wounded the female, but she sailed off over the prairie and went down among some tall grass, where she could not be found; the male did not come within gunshot, though he rose twice from the nest on my approach. The nest was a slightly depressed platform of twigs, with a little grass for lining. The eggs, three in number, were rotten, though containing well developed embryos. They measured 1.81 by 1.29, 1.77 by 1.33 and 1.88 by 1.33 inches, respectively [equal to about 46 by 32.8, 45 by 33.8, and 47.8 by 33.8 millimetres].

"On May 7, 1878, a second nest was found within 100 yards of the one just mentioned and the parent secured. The nest in situation and construction was precisely like the other, except that the yucca was higher, the top being about 12 feet from the ground. The eggs were three in number, all well advanced, but one with a dead embryo. They measured 1.78 by 1.34, 1.82 by 1.29, and 1.73 by 1.32 inches, respectively [equal to about 45.2 by 34, 46.3 by 32.7, and 44 by 33.5 millimetres]. The ground color is white, but so thickly dotted with reddish brown as to appear of that color; over these are somewhat heavier markings of deeper shades of brown."[1]

Among an exceedingly interesting collection of birds, nests, and eggs, made by Lieut. Harry C. Benson, Fourth Cavalry, U. S. Army, while sta-

[1] Proceedings U. S. National Museum, Vol. i, 1878, p. 152.

tioned at Fort Huachuca, in southern Arizona, and which he generously presented to the U. S. National Museum collection at Washington, D. C., are three sets of eggs of this Falcon. He writes me that he found it exceedingly shy and difficult to approach, but fairly common in that vicinity. According to his observations it often alights on the ground when pursued, and prefers the open plains, covered here and there with low mesquite trees, yuccas, and cactuses, to the more mountainous regions. He does not consider it a resident throughout the year, but he observed it as late as January. Five nests were found by the lieutenant during the spring of 1887, all of them placed in low mesquite trees from 7 to 15 feet from the ground. These nests were apparently old ones of the White-necked Raven (*Corvus cryptoleucus*), and used without any repairs being made to them. A nest found on April 25, 1887, contained three young birds, which were taken by him and raised, becoming quite tame; one found on April 28 contained three fresh eggs; another found on May 5 likewise contained three eggs, two with large embryos, the third addled. A fourth and fifth nest, both found on May 14, contained each two fresh eggs, possibly a second laying of some of the birds previously despoiled.

Their food consists of small reptiles, mice and other rodents, grasshoppers and insects of various kinds, and occasionally a bird.

The usual number of eggs laid by this species seems to be three; but nothing is known about the length of incubation. Nidification commences, occasionally at least, by the latter part of March, continuing through April and the first half of May, and it is not likely that more than one brood is raised in a season. It seems to be only a summer resident in the United States.

The ground color of the eggs of the Aplomado Falcon is a dirty yellowish white, and this is thickly sprinkled with reddish and chestnut brown blotches and spots of various sizes, almost completely obscuring the ground color. In one of the sets of eggs these markings are very fine, nearly of the same size throughout, and of a delicate reddish buff color, giving them quite a different appearance from the others. Judging from the limited number of specimens in the collection, their variation in color is fully as great, if not greater, than that found in the eggs of any of our Falcons. In general appearance they approach the eggs of *Falco rusticolus gyrfalco* nearer than any others.

The average measurement of nine specimens in the U. S. National Museum collection is 45 by 35 millimetres. The largest specimen measures 46.5 by 35, the smallest 43 by 35 millimetres.

Of the type specimens, No. 23001 (Pl. 10, Fig. 9), from a set of three eggs, was taken May 5, 1887, and No. 23020 (Pl. 10, Fig. 10), also from a set of three taken on April 28, 1887. Both were collected by Lieut. Harry C. Benson, U. S. Army, near Fort Huachuca, Arizona.

## 105. Falco tinnunculus Linnæus.

KESTREL.

*Falco tinnunculus* Linnæus, Systema Naturæ, ed. 10, I, 1758, p. 90. (B —, C —, R 422, C —, U 359.1.)

Geographical range: Europe, Asia, and Africa; accidental in eastern North America (Massachusetts).

The Kestrel, one of the most common birds of prey of the Old World, is admitted as a bird of our fauna, a specimen having been shot at Strawberry Hill, Nantasket Beach, Massachusetts, September 29, 1887, and which is now in the collection of Mr. Charles B. Cory, of Boston, Massachusetts.

Mr. Henry Seebohm says: "The Kestrel breeds in almost every part of the Palæarctic region and is common up to latitude 60° N. Farther north it rapidly becomes rarer, and north of the Arctic circle its appearance is only accidental, though there seems to be good reason to believe that Wolley once obtained a nest in Lapland as far north as 68°. North of the Alps it is principally a summer migrant, but in the countries south of the Baltic a few remain during the winter. South of the Alps it appears to be a resident.

"Mice form the chief part of the Kestrel's food; but occasionally small birds are taken, although very rarely and only when its usual fare is wanting; frogs, moles, caterpillars, lizards, and earthworms are also eaten. * * * The Kestrel appears to delay its nesting season until field mice and insects are plentiful. It generally breeds in the thickest woods and rarely in nests built in isolated trees. It also rears its young on the cliffs by the seaside, and some of the best places to seek for its eggs are the rocks on the moors and the cliffs of limestone districts. The Kestrel will also not infrequently lay her eggs in holes of buildings, notably among the ivied ruins and the Gothic architecture of cathedrals in company with Doves and Jackdaws. When the eggs are laid in the crevices of rocks a little cavity is, if possible, scratched in the soft earth or vegetable refuse, or, failing in this, some natural cavity in the rock itself is chosen in which to deposit the eggs. In the wooded districts a Crow's or Magpie's nest is the usual situation chosen by the Kestrel in which to rear its young, and sometimes the nest of a Ring Dove is used, and, more rarely still, that of a Sparrow Hawk. It is also worthy of remark that when a Magpie's nest is chosen the rooty lining is usually removed, probably from motives of cleanliness, and the eggs are laid on the hard lining of mud. As incubation advances the pellets containing the refuse of the bird's food accumulate and serve as a lining, beautifully soft, on which the eggs rest secure.

"Six eggs is the number usually found, although in some cases the number has been seven, and in others only four or five. They are rich reddish brown of various shades upon a dirty or creamy white ground. Most eggs of this bird when newly laid possess a purplish bloom which,

however, soon fades after exposure to light. The eggs of the Kestral vary from 1.70 to 1.45 inches in length, and from 1.35 to 1.12 inches in breadth [equal to 43.1 to 36.8 in length and from 34.3 to 28.4 millimetres in breadth]. The female Kestrel when laying does not always deposit an egg each successive day, and sometimes sits upon the first egg as soon as laid. The female bird usually incubates the eggs, although the male is sometimes found upon them."[1]

The eggs of the Kestrel resemble those of our Pigeon Hawk very closely, although a trifle smaller. The average measurement of thirty-nine of these eggs in the U. S. National Museum collection is 38.5 by 32 millimetres. The largest egg of the series measures 41 by 32.5, the smallest 36.5 by 30 millimeters. None are figured.

## 106. Falco sparverius Linnæus.

AMERICAN SPARROW HAWK.

*Falco sparverius* Linnæus, Systema Nature, ed. 10, i, 1758, 90.
(B 13, C 346, 346*a*, R 420, 420*a*, C 508, 509, U 360.)

Geographical range: Whole of temperate North America, and south (in winter only ?) through Central America to northern South America.

This handsome little Falcon, next to the Cuban Sparrow Hawk the smallest of our diurnal Raptores, is pretty generally distributed over nearly the entire North American continent, excepting the extreme Arctic portions thereof, breeding from Florida and the Gulf coast to the shores of Hudson Bay, and in the interior at least as far north as Fort Rae, Great Slave Lake, in latitude 62° N. Beyond this it does not appear to occur, otherwise that energetic naturalist and collector, Mr. R. MacFarlane, of the Hudson Bay Company, would certainly have met with and reported it. On the Pacific coast it is found from Cape St. Lucas, in Lower California, northward to Alaska, where it appears to be rare, however, at least in the interior of that Territory.

In the eastern United States it is not nearly so abundant as throughout the West, where I have found it a common summer resident almost everywhere, if suitable timber for nesting sites was available. Mr. L. M. Turner did not notice it in northern Labrador and the Ungava district, but it is known to be a summer resident of Newfoundland, Nova Scotia, and New Brunswick, and the more southern portions of the Dominion of Canada.

In winters from about latitude 38° S. and southward in the eastern United Stated, as well as in the Rocky Mountain regioun; on the Pacific coast from about latitude 41° S., though stragglers remain in sheltered and favorable localities at still higher latitudes throughout the country.

[1] History of British Birds, 1883, Vol. i, p. 45–50.

Like most of our Raptores the Sparrow Hawk, I believe, remains paired throughout life; at any rate they certainly appear to be already so on their return from their winter homes. They usually arrive on the old breeding grounds in the central portions of their range about the middle of March, some seasons not before the beginning of April, and at later dates farther to the northward. In Florida nidification begins about the middle of March, sometimes in the last half of February; in southern Arizona, southern Texas, and southern California about the first week in April; in the Middle States from April 15 to May 10, and in the more northern States from May 1 to June 1; in the Rocky Mountain region and thence westward to Oregon, Idaho, and Washington rarely before May 15, and usually during the last part of this month and the first ten days in June, and in the more northern portions of its range during the first two weeks in June.

The most common nesting place of the Sparrow Hawk is in holes of trees, either natural cavities or the abandoned excavations of our larger Woodpeckers. In regions where such sites are not readily obtainable, it resorts to holes in sandstone cliffs and clay banks. Occasionally a pair will nest in some dark corner in a barn, and even dovecots have been known to be appropriated. Such an instance is mentioned in the "History of North American Birds, 1874" (Vol. III, p. 174). Several observers report their nesting in Magpies' nests in the West, and Mr. H. R. Taylor states: "Of twelve sets of eggs of the Sparrow Hawk taken this year, in San Benito County, California, by a friend and myself, all but two were found in Magpies' nests, and these were placed one in a hole in an oak and the other in a cavity in a bank on the San Benito River."[1]

While such nests may be resorted to in certain localities, it is by no means a constant habit with this species. I believe there are few places in the United States where the Black-billed Magpie (*Pica pica hudsonica*) is more abundant than in the vicinity of the Nez Percé Indian Reservation in Idaho and the Sparrow Hawk is also common there, yet I never found a pair occupying a Magpie's nest, although the ordinary nesting sites used by it are rare on account of the scarcity of large timber. According to some observers they are also said to occasionally occupy open nests, but such instances must be very rare. Mr. Lynds Jones, of Grinnell, Iowa, informs me that he has found them breeding in open nests, usually old Crows' nests, and that very little or no new material is used, the old lining being simply rearranged. I have had excellent opportunities to study the nesting habits of this species, and only in one single instance had I reason to suspect that an open nest was used, and this was placed in the extreme top of a tall cottonwood tree on Lapwai Creek, Idaho, and was inaccessible. I repeatedly saw one of these birds sitting on the edge of this nest, which appeared to be rather a frail structure, if a nest at all, but it is very probable that it was made use of more as a perch to rest on, and that there was a cavity somewhere in the upper part of the tree which I failed to notice.

[1] Ornithologist and Oölogist, Vol. XIII, 1888, p. 95.

There seems to be a great difference in the manner of lining their nests. Strictly speaking, the Sparrow Hawk ordinarily makes no nest, depositing its eggs on whatever rubbish may be found in the bottom of the cavity used. Occasionally the eggs are laid on a few leaves or grasses, scarcely deserving the name of a nest. In some localities, however, they are credited with greater energy in this respect than is usually the case. Mr. J. W. Preston, of Baxter, Iowa, writes me as follows: "The amount of dry grass and leaves that this species sometimes carries into a hollow for its nest is prodigious. In one case a pair selected a hole in the end of a decayed branch which they filled with the dry leaves of the post oak a foot in depth, and then enough grass on this to fill a patent bucket."

Near Camp Harney, Oregon, Sparrow Hawks are very abundant, and I examined a great many of their nests, which usually were very accessible, the majority being placed in natural hollows or the excavations made by *Colaptes cafer* or *Melanerpes torquatus* in junipers, from 5 to 15 feet from the ground. In nearly every instance the four or five eggs were laid on the few chips usually found in the bottom of these burrows or on the decayed wood and rubbish in the natural cavities which had accumulated therein.

Dr. James C. Merrill, U. S. Army, found it nesting on ledges and in holes of cliffs and cut banks in Montana, the birds breeding along the lower streams usually laying five eggs, while those found in the mountains generally laid but four. Even when persistently disturbed the Sparrow Hawk will return to the same nesting site from year to year. They are diligent layers, usually depositing a second set and occasionally a third should they lose the first.

Mr. C. J. Pennock states: "In the spring of 1872 three sets of five eggs each, evidently from the same pair of birds, were taken at intervals of ten days each, from a partly decaying chestnut tree in southeastern Pennsylvania. In the spring of 1873 the same pair of birds probably occupied the old nesting site again, and on April 24 a set of five eggs was taken; on May 6, another set of four, and on May 23 the nest contained four more eggs, two of which were taken. On May 29 another egg had been deposited, making fourteen eggs laid by the same bird. The last varied greatly from the first eggs laid, being much smaller; the greatest difference, however, is in their color, the last eggs (the smallest) being but slightly marked, and one was almost white."[1]

Incubation lasts about three weeks; the young when first hatched are covered with fine white down and their heads, as is the case with most young birds of prey, are nearly as large as the remaining part of the body. Both parents assist in incubation and are very solicitous in the care of their family. No other birds are allowed to come in the vicinity of their nest at such times without subjecting themselves to a vicious attack, and it makes no difference if the intruder has greatly the advantage in size, as they will attack a Swainson's or a Red-tailed Hawk as readily as any other bird.

[1] Bulletin Nuttall Ornithological Club, Vol. III, 1878, p. 41.

Usually but one brood is raised in a season. Sometimes, however, fresh eggs of this species are found so late in the season that it seems as if two broods might possibly now and then be hatched. Mr. Frank Robinette, of Washington, District of Columbia, found a set of five fresh eggs of this species as late as the first week in August, 1889.

The nesting sites vary greatly, as has already been mentioned. I have seen their nests less than 4 feet from the ground, and again in the dead tops of pine trees fully 80 feet and more up. Oaks, sycamores, cottonwood and buttonwood trees, pines and other conifers, large willows, chestnuts, and, in the interior, junipers furnish them favorite sites, and where I have principally observed them, they are not at all shy and usually allow themselves to be closely approached. In the West they are oftener found in the narrow strips of timber bordering the streams or in the scattered juniper groves found in the foothills than in the heavier forests.

Mr. H. W. Henshaw tells me of a peculiar incident regarding this species which came under his observation in the spring of 1884, while collecting in the vicinity of Colorado Springs, Colorado. He found a nest of this little Falcon in a low pine stump, not more than 4 feet from the ground. The female was on the nest, her tail partly sticking out of the hole. As the bird could not be dislodged, and he did not want to pull her out by the tail, he left her. Coming by the place again sometime later in the day, he found her absent and saw on examination that the nest contained several eggs which were just ready to hatch, some of the eggs being chipped, and the young about to emerge from the shells. Wishing to procure a couple of young birds just hatched, he did not disturb the nest any further that day, but to his surprise on visiting it the next morning, the burrow was empty and no indications were visible to prove that it had been despoiled by any predatory animal. No sign of empty or broken shells was to be seen in the vicinity, and he came to the conclusion that the parents themselves had made the change, and carried the eggs or young to some other suitable burrow, a number of which were available in the immediate vicinity.

While in search of food, these handsome little Falcons frequently arrest their swift flight instantly, hovering suspended over the spot where their prey is supposed to be found. Their food consists principally of small rodents, grasshoppers, and other insects, and larvæ of various kinds; lizards and small snakes are also eaten by them, and occasionally, when other provender is scarce, especially in winter, small birds have to suffer. Grasshoppers when attainable form the bulk of their fare, and it is amusing to watch them catch and dispose of the latter, handling them as expertly as a squirrel does a nut, and no sooner has one been caught and swallowed than they are after another. They seize them with their talons both while on the wing and on the ground. After gorging themselves, they return to some favorite perch on a dead limb of a tree standing on the edge of a prairie or meadow, or to the top or the crossbars of a telegraph pole and sometimes to the wire itself. In the West,

where these little Hawks are abundant, every such pole in sight stretching across a prairie may sometimes be seen occupied by this or some larger species; they appear to be very attractive to all the Raptores, affording them an unobstructed view of the surroundings. Now and then this species is charged with molesting a young chicken, which may possibly be true in rare instances, but I am inclined to believe this to be in most cases the work of the little Sharp-shinned Hawk, with which it is often confounded by the average farmer. Their common call note is a shrill "kee hee, kee hee" repeated several times.

The number of eggs laid by this species seems to vary from three to seven; the latter number is rare, however, five and four being the number most commonly found. Personally I have examined some forty nests of this species, and in no case have I found over five eggs to a set. They are deposited at intervals of a day. Their shape varies greatly, the majority ranging from a rounded ovate to an oval, and a few may be called elliptical ovate. A very peculiar shaped set in the U. S. National Museum collection I would call blunt cuneiform.

The ground color of these eggs ranges from a pure clear white in a few instances to pale buff or cream color in the majority, and to a bright cinnamon rufous in a few others. They are spotted, blotched, marbled, and sprinkled with different shades of walnut brown, chestnut, cinnamon rufous, and ochraceous in various patterns; frequently these markings are confluent, predominating in some specimens on either end; in others they are heaviest in the center, forming a wreath. Mixed among the various tints a few eggs show handsome lavender colored shell markings. Scarcely any two sets are exactly alike. In some the markings are regular and minute, in others they are coarse and bold, and occasionally a specimen is entirely unmarked, being pure white throughout. I have found two such eggs among first sets.

The average measurements of a series of one hundred and sixty-nine eggs in the U. S. National Museum collection is 35 by 29 millimetres. The largest egg measures 39 by 32, the smallest 31 by 28 millimetres. Both extremes were taken by myself near Camp Harney, Oregon.

Of the type specimens, No. 17926 (Pl. 10, Fig. 11), from a set of five, was taken by Mr. W. A. Cooper, near Santa Cruz, California, May 9, 1875; No. 20638 (Pl. 10, Fig. 16), from a set of five; No. 20640 (Pl. 10, Fig. 14), from an incomplete set of three; No. 20643 (Pl. 10, Figs. 12 and 15), two, from a set of four, were all taken near Camp Harney, Oregon, on May 23 and 24, 1875, and June 1, 1875, respectively. No. 20660 (Pl. 10, Fig. 13), is from a set of five taken near Fort Walla Walla, Washington, May 22, 1881. All are from the Bendire collection.

## 107. Falco dominicensis Gmelin.

CUBAN SPARROW HAWK.

*Falco dominicensis* Gmelin, Systema Naturæ, I, 1788, 285.
(B —, C —, R 421, C 510, U 361.)

Geographical range: Islands of Cuba and Haiti; accidental or casual in southern Florida.

The Cuban Sparrow Hawk claims a place in our avifauna on the strength of stragglers having been taken in Florida. It is a much darker colored bird than ours, the breast and sides being a deep rufous color throughout, and it is a common resident of the Islands of Cuba and Haiti.

Dr. Jean Gundlach says: "The Cuban Sparrow Hawk, locally known by the name of 'Cernicalo,' is a common bird in the Island of Cuba, especially abundant about the borders of plantations, and is occasionally met with in the forests as well. It would not be an easy matter to find a locality covered with a few palms or other trees without seeing the little Cernicalo. They are generally met with in pairs; are peaceably disposed, but will not tolerate any others of their kind on their chosen range, which is somewhat limited. One may observe them perched either on some limb of a tree, the gable or roof of a building, or on a palm leaf, on the lookout for prey, which consists principally of lizards, grasshoppers, and other insects, which are caught by rushing at them with arrow-like swiftness, scarcely a movement of the wings being visible. It is astonishing how keen their sight is, as they seem to observe quite small objects at considerable distances. Small birds are also caught and eaten, and I have seen them about sundown successfully chase bats. They may also be seen almost daily during the evening twilight engaged in catching the large sphinx moths.

"During the mating season they often call and feed each other, and play together in aërial evolutions, circling about high in the air, then rapidly descending and rising again. While hunting, one of these birds may often be noticed to suddenly arrest its flight and hover for a moment or so over a certain point, then suddenly dart down on its prey; or, if it has disappeared, resume its hunt. After eggs have been laid or the young hatched, no large bird is tolerated about the neighborhood; Turkey Vultures and Herons are always chased, being especially obnoxious to them.

"The eggs, from three to five in number, are laid during March or April, and usually deposited in the hollow of a tree, a hollow palm, or a cavity in a wall or cliff. No regular nest is made."[1]

The eggs of the Cuban Sparrow Hawk are exact counterparts of those of our own species, with the exception that they are somewhat smaller. An egg in the U. S. National Museum collection, taken by Professor Poey in

[1] Journal für Ornithologie, Vol. XIX, 1871, pp. 373, 374.

Cuba in the spring of 1859, measures 32.5 by 27 millimetres. Two others, collected by Dr. Jean Gundlach in the spring of 1865, measures 33 by 29 and 32 by 29 millimetres. None are figured.

## 108. Polyborus cheriway (Jacquin).

AUDUBON'S CARACARA.

*Falco cheriway* Jacquin, Beiträge zur Geschichte der Vögel, 1784, 17, Tab. 4.
*Polyborus cheriway* Cabanis, in Schomburgk, Guiana, III, 1848, 741.
(B 45, C 363, R 423, C 535, U 362.)

Geographical range: Southern border of the United States (Florida, Texas, Arizona), and Lower California; south to northern South America, Ecuador, and Guiana.

This handsome bird, better known throughout its range as the Caracara Eagle, is generally a constant resident wherever found; this at least is the case in southern Texas, and also in southern Arizona, where I saw them in midwinter as well as during the summer months. It breeds in these localities, and also in Florida and Lower California.

Capt. B. F. Goss, who had excellent opportunities to observe these birds at various points on the Gulf coast of southern Texas, writes me as follows: "I found this bird quite abundant in the timber along the Gulf coast. Their nests were generally found in open spots in the woods, where the trees were low and scattering, and only a very few resorted to the heavier forests to breed. The earliest date on which I found them nesting was March 4, the latest on April 21. The nests were generally placed in low trees from 5 to 27 feet up, usually from 8 to 12 feet from the ground. These were largely, some of them wholly, composed of broom weed, an annual shrub growing about 2 feet high. This plant remains standing through the winter and dies, and the twigs are easily broken off in the spring. This material was piled up in a slovenly way in a crotch or on a horizontal limb, until a rough nest was formed; some of these were quite deeply hollowed, others slightly so; they looked unshapely, and many were insecurely placed, as I found several tilted over, so that the eggs had rolled out.

"Brown Pelicans bred in great numbers on an island in the Laguna Madre, off the coast of Texas. When these birds were returning to their breeding ground, with pouches filled with fish, the Caracaras would attack them until they disgorged, and then alight and devour their stolen prey. These attacks were made from above, by suddenly darting down on the Pelicans with shrill screams and striking at them with their talons. I am not certain as to whether they caught any of their prey before it reached the ground. I saw this maneuver repeated a number of times by a pair of these birds that nested on this island and by others that came from the

shore. They did not attack outgoing birds, but invariably waited for the incoming ones, and as soon as these were over land (so that the contents of their pouches should not fall in the water) they pounced on them.

"They were not especially shy, but rarely came within shooting distance, and were generally silent on the breeding grounds, but sometimes as they left the nest they uttered a prolonged cackling note."

"Mr. Herbert Brown informs me: "The Caracaras are common about Tucson, Arizona, in the vicinity of slaughter houses. On a hot day during the summer they can be seen frequently standing on the ground in the shade of bushes near where they feed. Some years ago I bought three young ones from a Papago Indian, who took them from a nest in a sahuara cactus, about 16 miles southwest of town. I kept them until they were full grown; they were extremely vicious, and would make a hissing noise and strike out with their feet whenever approached, notwithstanding the kindness that was shown them. This was their favorite method of settling disputes among themselves. They could inflict a very ugly wound, and I was much more afraid of their feet than their beaks."

According to Mr. William Lloyd they are very rare in Concho and Menard Counties, Texas, nesting from the last week in April until May 20. The nests here are usually placed in oaks or pines at a height of 18 to 50 feet. He says: "Although carrion feeding birds, they are very fond of live fish and frogs. I have seen them fishing repeatedly in Sonora, Mexico. In Concho County I have seen them hunting prairie dogs, in couples, and once showing a high degree of intelligence. One was hidden behind a tussock of grass while the other danced before a young lamb, trying to lead it from the place where its mother was grazing to where its companion was hidden. The ruse was nearly successful, as the lamb began to follow, but the dam, anxiously watching, finally called it back.

The nest is large and compact, with a depth of 4 or 5 inches. In one case at least, in Concho, they used the same nest for two successive seasons."

Mr. Nehrling says: "It is a showy bird and its flight is extremely elegant and quick. Although very shy, and not easily approached, it often builds its nest in trees not far from farmhouses. The farmers say they are as harmless as Turkey Buzzards. The nest is usually from 25 to 30 feet above the ground, and is built of sticks, sometimes lined with bits of cotton and Spanish moss; the cavity is very shallow. Often the birds, commonly single individuals, are to be observed with Vultures feeding together on carrion."[1]

Dr. James C. Merrill, U. S. Army, referring to this species, says: "I have seen a Caracara chase a jack rabbit for some distance through open mesquite chaparral, and while they were in sight the bird kept within a few feet of the animal and constantly gained on it in spite of its sharp turns and bounds. If one bird has caught a snake or field mouse its com-

[1] Bulletin Nuttall Ornithological Club, Vol. VII, 1882, p. 173.

panions that may happen to see it at once pursue, and a chase follows, very different from what is seen among true Vultures. The nests are bulky platforms of small branches, with a slight depression lined with fine twigs, roots, and grasses, or sometimes altogether without lining; they are placed in trees or on the tops of bushes at no great height from the ground. Both sexes incubate. I have not found more than two eggs in one nest, and these are laid at intervals of three or four days."[1]

In southern Florida the nests are usually placed on the tops of the cabbage palmettos, nidification beginning the first week in April. In South America, according to Mr. Darwin's statement, it nests occasionally in cliffs. With us it does not seem to do this, their nests being usually found in trees of various kinds, palmettos and sahuaras (*Cereus giganteus*). A nest brought to Mr. Brown's notice in Arizona was placed in a large Palo Verde tree, which contained three nearly fresh eggs on May 1, 1889.

I noticed these birds frequently about the outskirts of my camp on Rillitto Creek, near Tucson, Arizona, during the eighteen months I was stationed there, from October, 1871, to March, 1873. They were generally seen in pairs, foraging for such kitchen refuse as they could find in the vicinity of the camp. Although I never allowed them to be molested in any way, they were at all times exceedingly shy and difficult to approach closely, scarcely ever coming within range of a shotgun. A great part of their time seemed to be spent on the ground, walking around in search of food, and I believe that a good deal of their hunting is done in this way. Their food, besides rabbits and small rodents, consists largely of lizards, beetles, grasshoppers, and snakes. I saw one of these birds engaged in quite an encounter with a good sized snake which had partly coiled itself about its neck, both bird and snake struggling for a few minutes at quite a lively rate. The Caracara had the best of the fight, however, and before I could get to the place, the bird was off with its quarry, the snake still squirming and twisting about in its talons. I was disappointed in not being able to learn the species to which it belonged. On but a single occasion did I see more than a pair together; this was on June 20, 1872, when a party of four were seen feeding a short distance below my camp.

Nidification begins in southern Texas sometimes as early as the middle of February, but usually about the first week in March; in other localities generally not until the beginning of April, and in Arizona about the latter part of the month. But one brood is raised in a season; incubation, as with the majority of the Raptores, lasting probably about four weeks. Both sexes incubate, and the eggs are deposited at intervals of several days. They are usually two or three in number, the smaller sets being somewhat more frequent. The shell is comparatively smooth and not as thick as is usual among the larger Raptores. The eggs are rounded ovate in shape; the ground color when visible, which is not often the case, is creamy white, and in the

[1] Proceedings U. S. National Museum, Vol. I, 1878, p. 153.

majority of specimens is entirely hidden, the egg appearing to be of a uniform rufous cinnamon of different shades, some of the darker approaching vinaceous rufous. This is again overlaid with irregular blotches and spots of dark chocolate, claret, brown, and burnt umber. Most of these eggs are heavily marked, a few, however, only slightly, and in these the markings are usually small and more regular in outline; a few are unspotted, and although the ground color is not visible it is entirely overlaid with an even colored cinnamon tint. Others look clouded, as if smeared with the coloring matter, and a single specimen from Cape St. Lucas, Lower California, is a uniform creamy white, and spotted throughout with fine dots of reddish chocolate not much larger than pin points.

The average measurement of thirty-three specimens in the U. S. National Museum collection is 60 by 47 millimetres. The largest egg (abnormally large), from Comal County, Texas, measures 75.5 by 54.5, the next largest 63 by 48 millimetres. The smallest measures 55 by 44.5 millimetres, and comes from Matamoras, Mexico.

Of the type specimens selected to show the more common styles of markings, No. 21459, two eggs from the same nest (Pl. 11, Figs. 1 and 2), were collected in Comal County, Texas, March 7, 1876, and are from the Bendire collection; No. 22588 (Pl. 11, Fig. 3), a single egg taken near Corpus Christi, Texas, March 4, 1882; and No. 22592 (Pl. 11, Fig. 4), from a set of three taken at the same place February 15, 1884, were obtained in exchange from Capt. B. F. Goss, Pewaukee, Wisconsin.

## 109. Polyborus lutosus Ridgway.

GUADALUPE CARACARA.

*Polyborus lutosus* Ridgway, Bulletin U. S. Geographical and Geological Survey of the Territories, No. 6, 2d ser., February 8, 1876, 459.
(B —, C —, R 424, C —, U 363.)

Geographical range: Guadalupe Island, Lower California.

The Guadalupe Caracara, a much paler and browner colored species than the preceding, was and possibly still is a resident of the above mentioned island, which is situated some 220 miles south by southwest of San Diego, California, and is described as being about 15 miles in length and 5 miles in width, and has until recently been occupied as a goat raising station.

Dr. Edward Palmer, one of our Western pioneer naturalists, was the first ornithologist to visit this island in 1875. This visit resulted in important discoveries, not less than eight new species of land birds being added to our avifauna through his explorations there, and among them the one now under consideration. According to his observations the "Quelelis," as these birds were called by the inhabitants, were abundant on every part of the island, and no bird could be a more persistent or more cruel enemy of the poultry

and domestic animals. He says: "It is continually on the watch, and, in spite of every precaution, often snatches its prey from the very doors of the houses. The destruction of the wild goats is not so great, as these animals are better able to protect themselves than the tame ones. No sooner is one kid born, and while the mother is yet in labor with the second, than the birds pounce upon it, and should the old one be able to interfere, she is assaulted also. No kid is safe from their attacks, and should a number be together, the birds unite their forces, and with great noise and flapping of wings they generally manage to separate the weakest one and dispatch it. * * * These birds are cruel in the extreme and the torture which is sometimes inflicted upon these defenseless animals is painful to witness. * * *

"Hundreds of these birds have been destroyed by the inhabitants, both with poison and firearms, without any noticeable diminution of their numbers. They are said to lay three eggs, speckled like those of a Gull. When surprised or wounded they utter a loud harsh scream, something like that of the Bald Eagle. In fighting among themselves they make a curious gabbling noise, and under any special excitement the same sounds are given forth, with an odd motion of the head, the neck being first stretched out to its full length, and then bent backwards until the head almost rests upon the back. The same odd motions are made and similar noises uttered when the birds are about to make an attack upon a kid. Besides the principal sources of food supply already indicated, the birds have other means of subsistence; they eat small birds, mice, shellfish, worms, and insects. To procure the latter they resort to plowed fields, where they scratch the ground almost like domestic fowls."[1]

Ten years later, in January, 1885, when Mr. Walter E. Bryant visited the island the number of these birds had very materially decreased. At a still later date, in his "Catalogue of the Birds of Lower California," published in the Proceedings of the California Academy of Sciences, second series, Vol. II, 1889, p. 282, Mr. Bryant states: "So effective has been the work of extermination carried on against this bird that Dr. Edward Palmer, who first discovered them in 1875, says that he visited the island this year (1889) and did not see a single individual. He tells me that when he landed fourteen years ago the 'Quelelis,' as they are known there, were so numerous and bold that men were obliged to stand over the Angora goats with sticks to protect them from attack, particularly the kids which were not defended by their mothers. The short-haired kind will drive off the birds, so Dr. Palmer says from his observations; and now that man has abandoned the island, I cherish the hope that a pair at least may still be living, and that some future explorer may succeed in finding the unknown eggs and give us an account of the nesting habits of this peculiar species."

Their nesting habits and eggs probably differed but little from those of the allied species, Audubon's Caracara.

[1] Hayden's Survey, 1876, Bulletin No. 2, pp. 192-195.

## 110. Pandion haliaëtus carolinensis (Gmelin).

AMERICAN OSPREY.

*Falco carolinensis* Gmelin, Systema Naturæ, I, i, 1788, 263.
*Pandion haliaëtus* var. *carolinensis* Ridgway, Proceedings Academy Natural Sciences Philadelphia, December, 1870, 143.
(B 44, C 360, R 425, C 530, U 364.)

Geographical range: Temperate and tropical America in general; north to Hudson Bay and Alaska.

The American Osprey, commonly called the Fish Hawk, breeds in suitable localities throughout the entire United States, and beyond our borders as far north as Labrador, the shores of Hudson Bay, and in the interior of British North America, where it has been found on the Mackenzie River, near the Great Slave Lake, by Mr. B. R. Ross, in about latitude 62°; but inasmuch as that careful observer, Mr. R. MacFarlane, failed to notice it in the Anderson River and Barren Ground regions, it is questionable if it occurs farther north there. In Alaska it is well known to attain a considerably higher latitude, its eggs having been secured at Fort Yukon by Mr. J. Lockhart, as well as by Messrs. S. Jones and J. Sibbiston on other points of the Yukon River, in about latitude 67°.

In these northern regions, as well as throughout the greater part of the United States, it is only a summer resident, arriving along the shores of the Chesapeake Bay about the middle of March and correspondingly later northward. In Florida and the Gulf States it is a constant resident. In many localities the Osprey may be said to breed in colonies, numbers of them nesting in close proximity to each other.

Mr. W. W. Worthington, well known as a close and accurate observer, writes me as follows: "Almost invariably on the 20th day of March the Osprey arrives at Long Island and is reckoned as the first harbinger of the breaking up of winter and of settled spring weather. At first a solitary individual will be seen circling slowly over some creek, in eager search of his first finny meal in his summer home. In a few days they become abundant and at once set to work to repair any damage their nests may have received from the previous winter blasts, for they occupy the same nests year after year.

"At Plum Island, where there are not enough suitable trees to go around, many pairs nest on the ground, on the tops of sand dunes, in such cases depositing the eggs on the sand, the nest consisting of a few sticks, bunches of seaweed, and pieces of various kinds of rubbish arranged in a circle. In other cases the nests are built up several feet, the height in all probability being regulated by the number of years the nest has been occupied and the amount added to it from year to year. In all other localities where I have observed these birds breeding, they nest in trees, both in deep woods and exposed situations, excepting in a few instances, where an unusual nesting place was chosen,

either on the cross bar of a telegraph pole, on a large rock in Gardiner's Bay, or on an unused chimney of an occupied dwelling-house.

"The materials used in nest building consist principally of large sticks, small dead branches, and dry seaweed. I have found a sheep's skull, old shoes, the dried-up remains of a duck, a large stone, and other odd things in their nests. Three eggs are usually laid during the first week in May, and are hatched in about three weeks. The young are at first covered with whitish down and are fed on the changeless diet of their parents—fish, which are torn up and given to them in suitable sized pieces. They grow rapidly and soon feather out similar to the old birds. The Ospreys are very solicitous for the safety of their eggs and young, and with loud screams they will dart within a few feet of an intruder; one instance has come to my notice of their actually attacking the collector, a young friend of mine who was ascending to the nest of a pair of these birds, when one of them struck him on the back and nearly knocked him from the tree.

"It is a common habit of the Purple Grackles to nest in crevices of the Osprey's nests, and I have examined as many as half a dozen of their nests in one belonging to an Osprey. I have also observed the European House Sparrows taking advantage of these nesting sites. The Ospreys remain with us just about half the year and depart for the south about the 20th of September."

Mr. Moses B. Griffing, who has kindly collected a fine series of these eggs for the U. S. National Museum, several of which are figured in this work, informs me: "The earliest date on which I took a set of eggs of the Osprey on Shelter Island, was April 24, 1879, the latest June 7, 1882. The first set contained three fresh eggs, the last set, two, slightly incubated. They raise but one brood in a season, but will lay a second set, usually of two eggs, if the first one is taken. They nest generally in trees at a height of from 8 to 60 feet. I have seen their nests in the tops of cedars, the various species of oaks, hickory, poplar, buttonwoods, tupelos, wild cherry, black walnut, and pear trees. From one nest on Gardiner's Island, New York, I took sets of four eggs in two consecutive seasons; and in other nests I have seen four eggs one season and three the next. In the early spring they frequent the salt creeks to fish; later, mostly the bays and deeper water, where they catch menhaden or moss bunkers. On Gardiner's and Plum Islands this species may safely be said to breed in colonies, while on Shelter Island, and other localities near it, the nests are scattered, sometimes on isolated trees and again in woods and swamps. In the latter case a tree larger than the surrounding ones is chosen. I have seen nests in such small, low trees that they could be reached while standing on the ground."

Mr. Charles S. Shick says: "The Fish Hawk is one of the most familiar of the Raptores of southern New Jersey. Cape May County is noted for its many wooded islands lying between the mainland and ocean, and they afford these birds a congenial home. They are very abundant on Seven-Mile Beach, and several hundred pairs have nested on this island every season. It is interesting to watch the Fish Hawk obtaining its food. Sail-

ing along from 50 to 100 feet above the water, with its keen eye it can easily see any fish swimming close to the surface of the water, and as soon as it sees its quarry, stops its flight, remains suspended motionless in the air for a moment, closes its wings, and then darts downward like an arrow. It disappears under the water for a few seconds, and when it rises and again takes wing a shining, wriggling fish can be plainly seen in the grasp of its powerful talons. It is a curious fact that this bird will never carry the fish with the tail to the front. Many times have I seen them turn the fish around in mid air. The nest from which I sent you the handsomely marked set of eggs, taken on May 12, 1890, was placed in the top of a dead cedar about 50 feet from the ground. It was composed of large sticks, dead branches of trees, pieces of driftwood, and oyster grass, neatly lined with fine sedge grass, cow dung, mud, and cedar bark; it had been occupied for a number of years. About 75 feet away from the nest was a platform on another old stump of a tree, which at one time had also served as a nest. This the male evidently used as a feeding perch, as beneath it a quantity of scales, bones, and skeletons of fish were scattered about, mainly those of the common menhaden or moss bunker. Quite a number of the nests here are lined with fish bones and cow dung."

Judge J. N. Clark writes me: "One curious fact in reference to the Osprey I noticed here on two occasions, was the building of nests late in the summer, either for next year's occupancy or for resting in during the season, long after breeding time was over. One such nest was used the next spring; in the other case the bird was shot. Another strange thing to me is that experience seems to teach nothing to these birds. I live about 2 miles from the seashore, and one of the matters of daily observation is to see an Osprey wearily bringing a heavy fish from the sea and passing on toward the woods where invariably one or more Bald Eagles are waiting to seize the prey it brings. A few futile efforts to escape, a few notes of remonstrance, and it surrenders to superior prowess, and again returns to the fishing grounds, only to repeat the same weary round over and over again. It often has the appearance of being purposely done for the accommodation of 'His Majesty the King of Birds.'

Mr. A. W. Anthony writes me that the Fish Hawk nests on the ground as well as on cliffs along the coast of Lower California. He says: "Near San Geronimo, Lower California, I found about a dozen of their nests on April 20, 1887; all of which were built on the ground or on small ledges of rock—none were over 4 feet in height—consisting of large piles of kelp and sea grass, etc. Some of these nests contained eggs from fresh to heavily incubated, and others young birds several days old.

"On St. Martin Island I have found young flying about by April 12, 1888, while other nests had young just hatched or fresh eggs. Nests on this island were placed on the ground, excepting a few cases where the birds had taken advantage of low bushes, raising them 2 feet or so. On Cerros Island, Fish

Hawks' nests were very common; but here the cliffs and rocky ledges had been taken advantage of, many of which were inaccessible, and all more or less difficult to reach."

The Osprey generally nests in the tops of trees of various kinds. In the West I have found their nests mostly in very tall pines, the tops of which had been broken off during a storm. Such trees were always selected in preference to any others, even if they were some distance from a body of water. The nest was invariably placed on the very top of the broken stump. Occasionally I have seen one in a cottonwood. On the Little Red River in central Arkansas, Mr. Gault informs me that the Fish Hawk nests in holes in the sandstone bluffs along that stream, and I have seen them using similar locations on the Upper Columbia River in Washington, where no timber is found in close proximity to the river.

The most picturesque nesting site of the Osprey I ever saw was located in the midst of the American Falls of Snake River, Idaho. Right on the very brink of these, and about one-third of the way across, the seething volume of water, confined here between frowning walls of basalt, was cleft in twain by a rocky obstruction which had so far withstood the ever eroding currents, and this was capped with a slender and fairly tapering column of rock rising directly out of the swirling and foaming whirlpool below. On the top of this natural monument, whose apex appeared to me to be scarcely 2 feet wide, a pair of Ospreys had placed their nest and were rearing their young amidst the never ceasing roar of the falls directly below them. The nests are often rather small considering the size of the bird, and usually not over 18 inches in outer diameter. Nests which have been in use for a number of years, however, are often quite bulky and very firmly built, in order to withstand the strong gales to which they are frequently exposed.

Mr. Manly Hardy found a nest of this species on a high bluff placed between three stumps; the nest was a large one and constructed principally out of shreds of cedar bark; it contained two fully grown young. Another nest found by him was placed on a bare ledge of rock just above high tide. This was constructed entirely of kelp stalks and contained one young bird just able to fly.

In central Florida nidification is said to begin, some seasons at least, in January, and probably earlier still in the southern portions of the State, and it continues into March and the beginning of April, while in the more northern parts, like St. Johns and Putnam Counties, according to Dr. William L. Ralph's observations, the Osprey rarely nests before March 1, and usually in the latter part of this month. Mr. C. J. Pennock found several nests of the Osprey near St. Marks, Florida, containing fresh eggs in the first week of April, 1889. These nests were all placed in high trees, pines or cypress, and all but one in living trees. In Lower California the nesting season begins in February and lasts until the beginning of May. In northern Idaho I usually found full sets of fresh eggs the first week in May, the same holding good in Oregon and Washington. On the middle Atlantic coast they also commence laying about

the same date; in Maine about the latter part of May, and in Nova Scotia, as well as in the interior of Alaska, not until June, nearly fresh eggs having been taken by Mr. J. Lockhart, at Fort Yukon, on June 27.

The food of the Osprey consists entirely of fish, which are caught as already described, and these are usually the inferior species, such as are seldom used for the table. In Florida they live almost entirely on catfish, and on the interior lakes and streams of the Pacific coast subsist to a great extent on suckers, and frequently on some of the smaller species of salmon and whitefish (*Coregonus*).

But a single brood is raised in a season. Incubation is said to last about twenty-one days, but I am inclined to believe that it is nearer twenty-eight. The usual number of eggs is three, occasionally only two, and seldom four; they are among the handsomest of those laid by the Raptores, and subject to an endless variation in color, markings, and size. They are deposited at intervals of one or two days and the shell is strong and minutely granulated.

The eggs of the Osprey vary greatly in shape, ranging from an ovate to either a short, rounded, elliptical, or elongate ovate. The ground color is usually a creamy white, and this is sometimes so evenly and regularly overlaid with pigment as to give it a buffy or vinaceous appearance. Now and then a specimen is found showing a uniform cinnamon rufous or ferruginous color throughout, without any indications of blotches, thus strongly resembling certain types of eggs of the Falcons. The markings show an equally wide range of variation, both in amount and size. The majority of eggs are heavily blotched and spotted, but generally more thickly about the larger end, and these markings include nearly all the different shades of brown and vinaceous red. In some eggs lavender and pearl gray shell markings predominate, but in the majority of specimens before me these are either few or entirely absent; the beautiful vinaceous red tints found in some of the eggs of this species when fresh become darker with age.

The average measurement of sixty-nine specimens in the U. S. National Museum collection is 62 by 46 millimetres, the largest egg, from Cape St. Lucas, Lower California, measuring 68.5 by 49.5, the smallest, taken on Seven-Mile Beach, Cape May County, New Jersey, 59.5 by 42 millimetres.

Of the type specimens selected to show some of the many styles of coloration and markings, No. 20709 (Pl. 10, Fig. 17), from a set of three eggs, Bendire collection, was taken by Mr. A. R. Justice, near Cape May, New Jersey, June 1, 1875. No. 23965 (Pl. 11, Fig. 5), from a set of four eggs; No. 23967 (Pl. 11, Fig. 6), from a set of two, and No. 23969 (Pl. 11, Figs. 7 and 8), two specimens from a set of two, were collected on Shelter Island, New York, May 7, 1890, by Mr. Moses B. Griffing (and especially selected from a large number for the purpose of illustration); No. 23974 (Pl. 11, Fig. 9), from a set of two, was taken by Mr. Charles S. Shick, on Seven Mile Beach, Cape May, New Jersey, May 21, 1890. The other egg of this set is of nearly a uniform reddish brown color throughout, and resembles one of the types of *Polyborus cheriway* (Fig. 3, Pl. 11), very much, but cannot be figured from want of space. A normal colored set of three eggs had been previously taken from this nest.

## Family STRIGIDÆ. Barn Owls.

### III. Strix pratincola Bonaparte.

AMERICAN BARN OWL.

*Strix pratincola* Bonaparte, Geographical and Comparative List, 1838, 7.
(B 47, C 316, R 394, C 461, U 365.)

Geographical range: United States generally (rarer northward) and Mexico.

The northern limit of the breeding range of the Barn Owl extends from about latitude 40° 30′ (Flushing, Long Island, New York) westward through the Middle States, but going southward these birds become more and more abundant, and north of latitude 41° it can only be considered as a rare straggler, though it is probable that a pair may breed now and then in favorable localities at a somewhat higher latitude. It has been met with near Hamilton, southern Ontario, Canada, at Sault St. Marie, Michigan, in Wisconsin, and Minnesota. In the New England States it has been taken in Connecticut and Massachusetts. It is not uncommon in Kansas and portions of southern Nebraska. On the Pacific coast it breeds from California southward, and according to Dr. Cooper its range extends through Oregon to the mouth of the Columbia River in latitude 46°. I have never met with it in southeastern Oregon, southern Idaho, and northern Nevada, and if it occurs at all in these regions it must be rare.

The Barn Owl is one of the most useful and harmless birds of prey, subsisting almost entirely on noxious vermin, such as ground squirrels, rats, pocket gophers, mice, and on shrews, bats, frogs, small reptiles, grasshoppers, and beetles. Very rarely small birds are caught by them, and occasionally a young rabbit varies the usual bill of fare. Looked at from an economic standpoint it would be difficult to point out a more useful bird than this Owl, and it deserves the fullest protection, but, as is too often the case, man, who should be its best friend, is generally the worst enemy it has to contend with, and is ruthlessly destroyed by him partly on account of its odd appearance and finely colored plumage, but oftener from the erroneous belief that it destroys the farmer's poultry.

It hunts during the evening and throughout the night, when its rather peculiar screaming may be frequently heard. During the day it remains hidden either in natural hollows in trees, cavities in the perpendicular bank of some ravine or cliff, burrows in the ground, abandoned buildings, old mining shafts, church steeples, barns, or similar retreats. In fact it does not object to abide near human habitations and frequently nests in the very center of cities of considerable size. Its flight, although accompanied by considerable flapping of the wings, is entirely noiseless, and the capture of its humble prey is thus greatly facilitated. The number of rats, mice, and other noxious vermin re-

quired by a pair of these Owls to feed their family, usually consisting of from five to seven young, is almost incredible, and I am certain exceeds the captures of a dozen cats for the same period. The young owlets are always hungry and will eat their own weight in food daily and even more if they can get it.

In the southern portions of the United States the Barn Owl is resident throughout the year, and at times somewhat gregarious during the winter. Mr. B. W. Evermann states that he saw a flock of more than fifty among the oaks in the Cañada de Largo, a few miles from San Buenaventura, California, and I believe it is more abundant in southern California than in any other portion of the United States. I met with it several times in the neighborhood of Tucson, Arizona, where they were rather rare, but they seem to be pretty generally distributed over this Territory, where they usually live in abandoned mining shafts and prospect holes. Mr. Herbert Brown writes me that he met with five of these birds in an abandoned mine at a depth of 50 feet I saw one actively engaged in hunting along the banks of Rillitto Creek during a cloudy day in December, 1872, and in April of the same year saw another on quite a bright sunny day being chased by either a pair of common Crows or White-necked Ravens. In this vicinity I believe they nest mostly in deserted burrows of badgers, at any rate more than once I saw them sitting in the mouth of such burrows.

Their nesting sites are quite variable and include all sorts of places, such as natural hollows in trees, holes and cavities in clay banks or cliffs, burrows under ground enlarged to suit their needs, in the sides of old wells, abandoned mining shafts, dovecots, barns, church steeples, etc., and sometimes, though rarely, in perfectly exposed and unprotected situations, such as the flat roof of an occupied dwelling-house in the midst of a village. Mr. W. O. Emerson, of Haywards, California, writes me: "A pair of Barn Owls nested the past season (1889) on the bare tin roof running around a cupola of a neighbor's house, which was surrounded by a low railing. Not less than twenty-four eggs were laid and none of them were taken away at any time. There was no nesting material on which the eggs were placed, not even a single twig, and they naturally rolled around on the roof, as it was impossible for the bird to cover them all. When taken down finally and examined, it was found they were all rotten, caused, no doubt, by the intense heat from the sun's reflection on the tin roof."

Where holes in clay banks along rivers and the sides of ravines are used, or the deserted burrows of ground squirrels or larger rodents, they are enlarged to suit their needs, and the birds live in them the year round, carrying most of their food to these places to be devoured at leisure.

In southern California nidification begins occasionally as early as January, and while usually but a single brood is raised by these birds in a season, now and then they will rear two. Mr. F. Stephens informed me that a pair hatched a brood of six young in January, 1885, at St. Isabel, California, and on March 25 the bird was sitting on a second set of ten eggs,

using the same site, a dovecot in the barn. In southern Texas they begin laying about the latter part of February or the beginning of March, and correspondingly later northward.

At Washington City, District of Columbia, where the Barn Owl is by no means rare, they begin nesting from the last week in April to about the 10th of May, and I know of at least three broods having been raised within the city limits during the season of 1890. A pair of these Owls have been nesting off and on for years in one of the towers of the Smithsonian Institution building, and occupied this site again during the spring of 1890, rearing a family of seven young. As the supply of these birds in the zoölogical collection now forming at the national capital consisted of but a single specimen, which had been kept in confinement there for some months, the young above mentioned were taken from the nest before they were quite ready to fly and placed in the cage with the one already there; she at once adopted the orphans, and cared for and fed them as diligently as if they had been her own.

The Barn Owl, strictly speaking, makes no nest. If occupying a natural cavity of a tree the eggs are placed on the rubbish that may have accumulated at the bottom; if in a bank, they are laid on the bare ground and among the pellets of fur and small bones ejected by the parents. Frequently quite a lot of such material is found in their burrows, the eggs lying on and among this refuse. Incubation usually commences with the first egg laid, and lasts about three weeks. The eggs are almost invariably found in different stages of development and young may be found in the same nest with fresh eggs. Both sexes assist in incubation, and the pair may be sometimes found sitting side by side, each with a portion of the eggs under them.

Besides the peevish scream already mentioned, they utter at times a feeble querulous note like "quäek-quäek," or "äek-äek," sounding somewhat like the call of the Night Hawk (*Chordeiles virginianus*), frequently repeated, only not so loud. Like most Owls, they snap their mandibles when disturbed, producing a sort of clicking sound; at other times they make an unpleasant hissing noise like that of escaping steam. During the daytime they are sleepy, sad looking birds, but alert and active enough at night.

In disposition they are amiable, seldom fighting each other, even when feeding. Their quarry, if small, is firmly grasped with one foot; when larger, like a good sized Norway rat, the bird stands upon and holds it firmly with both feet, tearing it gradually to pieces, nearly always beginning with the head, which appears to be the part most liked.

The average number of eggs laid by this species is from five to seven, seldom less. Larger sets containing from nine to eleven eggs are by no means uncommon; it is questionable, however, if every egg in such large sets is usually hatched.

In shape the eggs are mostly ovate, a few are elliptical ovate, and a single specimen before me is elongate ovate. They are pure dead white in color, the shell is finely granulated, and they are decidedly more pointed than Owls' eggs in general.

The average measurement of twenty-seven specimens in the U. S. National Museum collection is 42.5 by 32.5 millimetres, the largest egg measuring 47.5 by 33.5, the smallest 40.5 by 27.5 millimetres.

The type specimen, No. 20627 (Pl. 12, Fig. 1), selected from a set of five from the Bendire collection, was taken April 4, 1876, near Santa Cruz, California.

## Family BUBONIDÆ. Horned Owls, etc.

### 112. Asio wilsonianus (Lesson).

AMERICAN LONG-EARED OWL.

*Otus wilsonianus* Lesson, Traité d'Ornithologie, 1831, 110.
*Asio wilsonianus* Coues, Check List, ed. 2, 1882, 81, No. 472.
(B 51, C 320, R 395, C 472, U 366.)

Geographical range: Whole of temperate North America; south to the tablelands of Mexico.

The breeding range of the American Long-eared Owl covers the United States in general, but it is perhaps less abundant in the South Atlantic and Gulf States than in the central, northern, and western portions. It likewise breeds north of our border from Nova Scotia, New Brunswick, and southern Canada, west to the provinces of Manitoba and Saskatchewan, where it is reported as common in the woods skirting the Saskatchewan plains. Here it reaches latitude 54° N., and probably still farther north. On the Pacific coast it is met with from Lower California and Arizona, north through California, Oregon, and Washington, and extending well into British Columbia. It is equally common throughout the Rocky Mountain region.

From the nocturnal habits of the Long-eared Owl it might be entirely overlooked for years by the average observer, even in localities where it is fairly common; whereas another, thoroughly familiar with its haunts, would have no difficulty in detecting its presence at any time. Except during the mating season it is rather a silent bird, and the few notes which I have heard them utter, when at ease and not molested, are low toned and rather pleasing than otherwise. One of these is a soft toned "wu-hunk, wu-hunk," slowly and several times repeated, which really sounds much better than it looks in print; another is a low twittering, whistling note like "dicky, dicky, dicky," quite different from anything usually expected from or attributed to the Owl family. In the early spring they hoot somewhat like a Screech Owl, and may be often heard on a still evening, but their notes are more subdued than those of the latter.

Mr. J. W. Preston, of Baxter, Iowa, writes me that one of their notes resembles the "me-ow-ow-ow-ow" of a cat. Another is a subdued "hoo-hoo" or "oo-oo," often uttered for hours during the mating time. At a distance this sounds something like the lowing of a cow. He further states: "At the nest, when disturbed, the female ruffles her feathers, flies to the ground, curves

her wings over her head, spreads her tail and feigns lameness, dragging herself along on the leaves, all the time snapping her mandibles, making a rapping noise as if two sticks were struck together. She will, at such times, also mew like a cat; if followed, she makes her way in a direction opposite to the nest. While this performance progresses the male is, perhaps, giving vent to his feelings by fluttering about and squealing like a half-grown rat in a trap, or muttering a mournful "hoo-maa-maa-voo" in a subdued tone. I have often mistaken the notes of this bird for those of human beings. On April 3, 1886, I took a fresh laid egg of the Long-eared Owl from a nest of Crow's eggs, and the parent of the latter did not seem to mind the intrusion."

Although I have examined quite a number of the nests of this Owl (some forty), in various parts of the West, I have never found the parents as demonstrative as Mr. Preston says they are; and in not a single instance did either of the birds fly to the ground when driven from the nest and feign lameness, or make much noise except that produced by the snapping of the mandibles. The female would simply ruffle her feathers, fly into a neighboring tree or some dense bushes, and watch my proceedings. On rare ocasions, she would utter a sound resembling the spitting and mewing of an angry cat. Like the Barn Owl, they are inoffensive and harmless birds, and on the whole far more beneficial than otherwise. Fully three-fourths of their food consists of the smaller rodents, such as squirrels, chipmunks, gophers, and mice; frogs also form a considerable part of their food where these batrachians are plentiful. Occasionally they make a meal of a small bird or a yŏung răbbit, but this is the exception and not the rule. While by no means devoid of courage, I doubt if they ever molest poultry or any of our game birds, and if any of the remains of the latter are found in their stomachs it is more likely that they have picked up a badly wounded bird, or one that had been shot and not recovered by the hunter. The smaller rodents are swallowed entire, and the indigestible parts, consisting of bones and fur, are subsequently ejected in the form of pellets. This applies to the Owl family in general, excepting possibly the little Elf Owl.

In the more settled portions of the country their nests are found in both deciduous and evergreen woods, in swampy as well as high and dry locations, but usually at no great distance from water; and the gloomiest and densest parts of the forests are generally selected for nesting sites. In the thinly settled portions of the West, they frequently nest in quite open and exposed situations, as a clump of willows or a small pine sapling or in the lower shrubbery bordering small streams or springs. The height of the nests from the ground varies considerably in different sections. In the majority of cases it is not over 20 feet, rarely over 30, and in the West not infrequently as low as 10 and 12 feet.

The Long-eared Owl rarely constructs a nest of its own; usually the last year's nest of a Crow is slightly repaired by being built up on the sides and lined with a litfle dry grass, a few dead leaves, and feathers; some of the latter may nearly always be seen hanging on the outside of the nest. Fully

three-fourths of the nests found by me occupied by these Owls were those of the Crow. Only a very few were evidently built by the birds themselves. One such found near Camp Harney, Oregon, on April 4, 1877, was placed in a thick bush of dry willows about 10 feet from the ground. This was tolerably well built, composed externally of small sticks and sprigs of willows and aspens. Some of the latter had been peeled by beavers, which were common in the vicinity, and they were still green and pliable; these fresh looking sticks drew my attention to the nest, which I mistook for that of a Raven or Crow. The inner cup was about 5 inches deep and lined with dry grasses and feathers; it contained four fresh eggs. An occasional pair where Magpies are plentiful will now and then use one of their nests, and natural cavities in dead trees are also sometimes used. In mountainous regions they are said to nest occasionally in cliffs. Most of the nests found by me were placed in rather open situations, in small willow thickets along some stream, or in an isolated clump in a swampy meadow, or on some hillside near a spring, but usually not far distant from other thickets. The most exposed nest I ever saw was found on April 24, 1877, near Camp Harney, and it contained six eggs on the point of hatching. It was evidently an old Hawk's nest—most likely Swainson's Hawk—placed in a small and very open scraggy juniper bush not over 6 feet from the ground; this bush stood entirely by itself and was quite a prominent mark on the point of an extensive sagebrush-covered table-land. It grew near the edge of the rim rock forming a perpendicular cliff, and there were no other trees or bushes of any size within a mile of it. This nest was in plain view from all sides and could be seen several hundred yards away.

These owls seem certainly more sociable and peaceably disposed toward each other than Raptores in general, as I have more than once found as many as three pairs nesting within a narrow strip of bushes not more than 100 yards in length and bordering a small creek. On another occasion I found a pair of Long-eared owls occupying a cavity in an old cottonwood stump not over 12 feet high; a Red-shafted Flicker had that season excavated a burrow directly over that of the Owl's and the two entrance holes, although on different sides of the stump, were not more than 2 feet apart. The birds seemed to live in perfect harmony with each other.

I believe these Owls are constant residents wherever found, although they are not as often seen in winter as during the remainder of the year, and they may migrate to a certain extent in severe seasons. Mr. Julius Hurter, of St. Louis, Missouri, informs me that on January 30, 1873, a flock of about thirty of these birds were seen by him resting in one tree in a swampy place in the Mississippi bottom, and that they remained in the neighborhood for several days.

On February 23, 1872, I saw about fifteen of these birds sitting close together on a small mesquite tree in a dense thicket in the Rillitto Creek bottom, near Tucson, Arizona. The fact that occasionally such numbers are seen together looks as if they did at times migrate.

Their hunting is done almost entirely at night, while the days are spent in shady and dark places, among the heavier and denser undergrowth, or in bushy trees in the neighborhood of water.

In the daytime, particularly on a bright sunny day, the Long-eared Owl will allow itself to be closely approached, and on discovering the intruder will try to make itself look slender and long by pressing the feathers, which are usually somewhat puffed out, close to the body and sitting very erect and still. It might in such a position be readily mistaken for a part of the limb upon which it may be sitting.

Occasionally, while on the ground, for instance, and being suddenly disturbed at a meal, they throw themselves into quite a different attitude—one of defiance, making themselves look much larger than they really are, and presenting a fierce and formidable front. I nearly stepped on one of them once while it was busily engaged in killing a ground squirrel which it evidently had just caught. The Owl was sitting by the side of a fallen pine tree and as I stepped over it my foot was planted within 12 inches of the bird; she evidently had not heard me approaching, nor had I any idea of her presence until almost on her, and was consequently about as much startled as the bird itself, owing in part to the instantaneous transformation that took place before my eyes. All at once she seemed to expand to several times her normal size; every feather raised and standing at a right angle from the body; the wings were fully spread, thrown up, and obliquely backward, their outer edges touching each other over and behind the head, which likewise looked abnormally large, and this sudden change in appearance, combined with the hissing noise which she uttered, made it appear a very formidable object at first sight. I presume she intended at first to stand her ground, but changing her mind quickly and collapsing to her normal size, flew off, leaving her quarry behind.

The Long-eared Owl nests rather early. In the southern portions of its range nidification commences sometimes in the latter part of February. Mr. F. Stephens took a set of six eggs from an old Crow's nest in southern California on March 2, 1879, the earliest date known to me. In the Middle States it may begin laying in the latter part of March, but more often about the first week in April, and in late seasons sometimes not until the first week in May. These dates hold good also for Oregon, Washington, and Idaho. In Montana they rarely begin to lay before May 1.

I believe that but a single brood is raised in a season. Incubation usually commences with the first egg laid, the eggs being deposited at intervals of a day or two. If the first set is taken, a second and somewhat smaller one, and even a third is laid, frequently in the same nest. Incubation lasts about three weeks; the young are covered with thick grayish white down when first hatched and are usually of different sizes, showing that they are not all hatched the same day.

The eggs vary from three to six in number. Sets of five are most often found, and occasionally one may contain seven. Six is the largest number I have personally found. They are pure white in color and oval in shape, and the shell is smooth, finely granulated, and rather glossy.

The average measurement of one hundred and three specimens in the U. S. National Museum collection is 40 by 32.5 millimetres, the largest egg measuring 43.5 by 33.5, the smallest 37.5 by 31 millimetres.

The type specimen, No. 20615 (Pl. 12, Fig. 2), selected from a set of five eggs from the Bendire collection, was taken by me on March 16, 1882, near Fort Walla Walla, Washington. This is the earliest date on which I have found eggs of this species; and incubation had already begun.

## 113. Asio accipitrinus (Pallas).

SHORT-EARED OWL.

*Strix accipitrina* Pallas, Reise, Russischen Reichs., I, 1771, 455.
*Asio accipitrinus* Newton and Yarrow, British Birds, ed. 4, I, 1872, 163.
(B 52, C 321, R 396, C 473, U 367.)

Geographical range: Entire western hemisphere, except Galapagos and part of the West Indies; also nearly throughout the eastern hemisphere, excepting Australia, etc.

The breeding range of the Short-eared Owl within our borders extends, as far as known at present, throughout the middle portions of the United States from about latitude 39° northward through the Dominion of Canada to the Arctic regions, where Mr. R. MacFarlane met with it quite commonly in the Anderson River country up to latitude 69°.

On the Pacific coast it is known to breed from southern Oregon, in the vicinity of Camp Harney, about latitude 42°, through Washington, Idaho, and British Columbia to northern Alaska; and it is not improbable that it may sometimes breed in California and Nevada.

In the northern portions of its range it is only a summer visitor, migrating south in winter. It is more than likely that it breeds, occasionally at least, in suitable localities along the borders of the extensive marshes on the seacoast of the South Atlantic States. By far the greater number of these birds, however, breed north of our borders.

In its general habits, the Short-eared Owl differs considerably from most of the other members of this family found with us, in being not nearly so nocturnal and in frequenting the more open country; for while most of our Owls inhabit timbered regions, this species shuns such sections and rarely even alights on a tree. Its home is amidst the rank grasses or weeds usually found along the borders of lakes and sloughs in the open prairie country, where it hides during bright sunshiny days. If the sky is clouded, this Owl may be frequently seen hunting in the early morning or evening and sometimes in the middle of the day, and at such times it flies very low, not more than a few feet from the

ground, which it carefully scans for its humble prey. Its flight is remarkably easy, graceful, and perfectly noiseless, very similar to that of the Marsh Hawk, but accompanied with more flapping of the wings. On account of the great length of the latter it looks while flying much larger than it really is.

From the fact that these Owls are generally seen in pairs at all seasons of the year it is very probable that they remain mated through life. During the winter of 1881–'82 a pair of these birds took up their permanent quarters near an inclosure in which several hundred tons of hay were stacked within the limits of the military post of Fort Walla Walla, Washington. These hayricks were placed under open sheds, and the lanes between each stack formed the favorite hunting grounds of these birds and furnished them an abundance of mice. As shooting was absolutely prohibited in this vicinity and the birds were never molested, they became quite tame, flying within 3 or 4 feet of the sentinels on duty there at night. One of my men informed me of this, and I visited the place several times to watch their actions. In cloudy weather they might be seen flying in and out between the haystacks during the greater part of the day, but when it was clear they only made their appearance about sundown. They generally flew close to the ground, not more than 3 feet above it; their prey was caught without apparently arresting their flight an instant, and then carried on top of one of the stacks where I presume it was devoured at leisure. During the day they remained hidden among the tall weeds, wire grass, and rushes growing in a marsh close to the corral. Aside from a faint squeak, which might have been that of a mouse when suddenly pounced on, I heard no note that might be attributed to them.

The food of the Short-eared Owl consists almost exclusively of small rodents, such as meadow mice and gophers, as well as grasshoppers, insects of various kinds, and occasionally a small bird. Like the Barn and Long-eared Owls, it deserves the fullest protection, being far more beneficial than otherwise.

In the southern parts of its range in the East, nidification is said to begin sometimes in March, usually in April and again not until the beginning of May. In the Arctic regions it does not commence until the latter part of May, usually about the first week in June, and occasionally a month later, Mr. W. J. Fisher taking a set of five eggs on Kodiak Island, Alaska, on July 12, 1882. Incubation had advanced about one-half in these eggs.

While in the Eastern States these birds may nest, as before stated, in March and early April, in the West, where I found their nests, in Idaho and Oregon, as well as in Washington, they do not as a rule begin laying before the last week in April, and generally about the first week in May. The first nests I found of this species, two in number, near Fort Lapwai, Idaho, was on May 6, 1871. Both were placed on the ground, one in the center of a tall bunch of rye grass, the other by the side of one of these, and both were well hidden. These tall bunches of grass grew with others amidst

small bushes and weeds on a little knoll in the center of a boggy place on a grass covered hillside, near the head of Tom Bell's Creek, about 4 miles east of the post. Both nests were in similar situations on opposite sides of the cañon, and not over half a mile from each other; they were simply slight depressions not more than 2 inches deep, lined with pieces of dry grass and a few feathers from the birds. One of the nests contained four eggs, two of which were slightly incubated; in the other one there were three eggs, which were fresh.

Both males were hidden in the tall grass close by the nest, and aside from an angry snapping of their mandibles they, as well as the females, made but feeble demonstrations in defense of their nests, merely circling around and alighting near by while I was in the vicinity. One of the birds uttered a weak whistling sort of note two or three times, the others were silent but kept bobbing their heads up and down and snapping their mandibles at the same time.

At Camp Harney, Oregon, two of their nests were found in similar situations on side hills in the last week in May, 1876, both containing three nearly fresh eggs, and two others in the following year, on May 1 and May 4. The last one was placed in the center of a thick but short bunch of grass on the level open prairie directly south of the post in daily use as a drill ground. I know that some of the men while drilling must have repeatedly passed within a couple of feet of this nest, if not directly over it, without flushing the bird. It was finally discovered by one of the lieutenants, whose horse almost stepped on the bird. This nest contained three eggs, two of which were broken either by the hoof of the horse or by the bird in its sudden start. It seems strange that this pair should have chosen such a site, as the drilling certainly commenced before any of their eggs had been laid and was continued daily, except on Sundays. None of the nesting sites found by me were resorted to again either during that or the succeeding year.

In Kansas and Nebraska they lay about the same time. Mr. H. A. Kline found a nest of this species on May 17, 1883, in Nebraska, containing eight eggs. It was placed on the ground and consisted of a lot of dry prairie grass and hollowed out 2 inches in depth. He says: "My dog was ranging a short distance in front of me when he was suddenly attacked by one of these Owls, which was soon joined by the other (the male), and together they succeeded in driving him from the field. They would swoop from right to left and strike him on the back with their wings. Not being used to such treatment by any member of the feathered tribe, he beat a hasty retreat, followed by both birds, and after chasing him some distance they returned to me and manifested great displeasure by swooping very close to me and snapping their mandibles, as many Owls do when angry."[1]

Mr. R. S. Williams, of Great Falls, Montana, writes me that he found a nest of this species containing six eggs nearly ready to hatch on June 13,

[1] Ornithologist and Oölogist, Vol. VIII, 1883, No. 8, p. 61.

1889. The nest was placed in a slight hollow surrounded by bunch grass, and it consisted of a few scattered straws and feathers from the bird.

According to Mr. W. H. Dall, U. S. Coast Survey, this species is resident and not uncommon in Unalaska, Alaska, and it is said to breed in burrows in the ground, usually on the side of a steep bank. The hole is horizontal and the inner end usually a little higher than the entrance and lined with dry grass and feathers. Those examined by him did not exceed 2 feet in depth.

On the Atlantic coast Mr. W. E. D. Scott found it breeding at Long Beach, New Jersey, taking a set of seven partly incubated eggs on June 28, 1873, and the National Museum collection contains a set of six taken by Mr. Thomas Beesley, near Cape May, New Jersey, in 1860.

It is gregarious at times, Dr. Elliott Coues observing a gathering of from twenty to thirty on the Colorado River, near Mojave, Arizona, and I have seen small parties of five or six, probably the old and young, along the marshes of Malheur Lake in Oregon.

Incubation probably lasts about three weeks, and ordinarily but a single brood is raised. The eggs are usually from four to seven in number, rarely more, though if Indian and Eskimo testimony is to be relied on, they lay as many as ten and even twelve, but this is scarcely probable. They are white in color, with a very faint creamy tint perceptible in most of the specimens; the shell is smooth, finely granulated, and not as lustrous as are the eggs of the preceding species. In shape they vary from oval to elliptical ovate, and a few are nearly equally pointed at each end.

The average measurement of fifty-six eggs in the U. S. National Museum collection is 39 by 31 millimetres, the largest egg measuring 42 by 32, the smallest 37.5 by 29.5 millimetres.

The type specimen, No. 13824 (Pl. 12, Fig. 3), selected from a set of five eggs, was taken June 30, 1865, by Mr. R. MacFarlane, near Anderson River Fort, Arctic North America.

## 114. Syrnium nebulosum (Forster).

BARRED OWL.

*Strix nebulosa* Forster, Philosophical Transactions, xxii, 1772, 386.
*Syrnium nebulosum* Boie, Isis, 1828, 315.
(B 54, C 323, R 397, C 476, U 368.)

Geographical range: Eastern North America; north to the more southern British provinces; south to Georgia and northern Texas; west to eastern Nebraska and Kansas.

The range of the Barred Owl, next to the Great Horned Owl the largest of this family breeding within our borders, extends through that portion of the United States east of the Mississippi Valley from Georgia northward to the southern border of the Dominion of Canada south of latitude 50° N., where it

has been met with in Nova Scotia, the southern parts of the provinces of Quebec and Ontario and southeastern Manitoba. Westward it reaches Minnesota, Iowa, Missouri, the eastern parts of Nebraska, Kansas, the Indian Territory, and northeastern Texas. Excepting in the more northern parts of its range it is a constant resident and breeds wherever found.

The Barred Owl is readily distinguished from the Great Horned Owl by its somewhat smaller size, conspicuous rounded head, due to the absence of ear tufts, its greenish yellow beak, and handsome dark colored eyes. In the central and southern parts of its range it is quite common, frequenting mostly the heavy timbered and, preferably, swampy tracts near water courses, and spending the days generally in natural hollows of trees or in dense shrubbery. Like most of the birds of this family, it is nocturnal in its habits, but nevertheless sees well enough and even occasionally hunts in the daytime, especially during cloudy weather. I believe that Owls in general prefer to remain hidden during the daytime on account of attracting the attention of nearly every feathered inhabitant of the vicinity, who instantly attack and annoy them in every possible manner the moment they leave their retreats.

The flight of the Barred Owl, like that of other members of this family, is easy, and though quite swift at times it is perfectly noiseless. A rapidly passing shadow distinctly cast on the snow-covered ground is often the sole cause of its presence being betrayed as it glides silently by the hunter's camp fire in the still hours of a moonlight night. Far oftener, however, it announces itself by the unearthly wierd call notes peculiar to this species, which surpass in startling effect those of all other Owls with which I am familiar. It is necessary to listen to such a vocal concert to fully appreciate its many beauties, (?) as it is impossible to give an accurate description of the sounds produced when a pair or more of these birds try to outdo one another.

Mr. J. W. Preston, of Baxter, Iowa, writes me as follows on this subject: "Their notes are variable and sometimes easily mistaken for those of the the human voice. The base upon which they work is a 'hoo-hoo,' or 'too-too, but these syllables are modified and interchanged at pleasure. Here are a few samples, taken down as uttered by one of these birds while close to it: 'Hoo-hoo, ho-ho-ho-ho-ho, hoo-hoo-too-too, to-to, too-o.' Another call is somewhat like this, 'too-too, to-to, to-to, o-o' and still another, 'haw-haw, hoo-hoo.' Now and then a coarse mocking laugh, very humanlike, may be heard, and again this is changed to a mournful wail. Sometimes their notes are all cut up and uttered in great haste, with seemingly no cause for these violent outbursts. I disturbed a young bird once, causing one of its parents great uneasiness. It is impossible to describe all the notes uttered by it at this time; they were rendered in a subdued muttering and complaining strain, parts of which sounded exactly like 'old-fool, old-fool, don't-do-it, don't-do-it.'"

The Barred Owl is not infrequently heard calling in the daytime, more particularly during cloudy weather before a storm, these sounds emanating usually from the most dismal and gloomy parts of the forest. In the early

evening and throughout the night, especially during the mating season, their vocal efforts are so perceptibly increased that two or three individuals may succeed in producing such a startling variety of sounds as to lead to the belief that a small army of these birds had been turned loose in the neighborhood.

While the Barred Owl is not quite as harmless a bird as the three preceding species, when impartially judged it does far more good than harm; and many of the depredations of the Great Horned Owl are erroneously charged to it, owing to the slight difference in size between these birds. From a careful examination of ninety-five stomachs, made under the direction of Dr. C. Hart Merriam, in charge of the Division of Ornithology and Mammalogy, U. S. Department of Agriculture, it appears that only three contained poultry; twelve, other birds, among them two Screech and one Saw-whet Owl, but no game birds; while forty contained mice; fifteen, other mammals, among the latter but very few rabbits and squirrels; four, frogs; nine, crawfish; two, fish, and sixteen were empty. This is certainly not a bad record.

Mr. Frank Bolles, who recently published an exceedingly interesting and instructive article on "Barred Owls in Captivity," drawing attention to peculiarities of these birds, which only a thorough lover of nature would notice, says: "They feed also on snakes, earth worms, grasshoppers, different species of beetles and flies. They not only drank water freely, but took prolonged baths whenever fresh water was given them. Their tank was one foot and a half long, a foot wide, and ten inches deep. Their reflection in this comparatively deep and dark pool greatly amused them for a time. * * * With great interest in the result I placed nine live perch and bream in the Owls' tank one morning when they were about three months old. They had never seen fish before. As the light played upon the red fins and bright scales, the birds' excitement was amusing to see. In a very short time, however, they plunged feet foremost into the water, and with almost unerring aim lanced the victims with their talons and flew out with them. Then the head was crushed at its juncture with the backbone, the spines were bitten into jelly and the fish was swallowed."[1] Every page of this paper is full of interesting information, but want of space forbids additional quotations therefrom.

Except during the mating and breeding season the Barred Owl is an unsocial bird, spending the greater part of the year in solitude and resenting all intrusion of its kind. Throughout the greater part of its range the mating season begins about the first week in February, occasionally a week or two earlier or later, according to latitude and season.

The Barred Owl generally nests in natural cavities of trees, preferably in dense and swampy woods, and such as are in the vicinity of water courses, chestnuts, poplars, oaks, American lindens, elms, walnut, sycamores, maples, willows, birch, and sweet gum trees being most often selected for this pur-

[1] Auk, Vol. VII, April, 1890, pp. 101–114.

pose. A suitable site once taken possession of is tenaciously held from year to year, no matter how persistently the birds may be robbed of their eggs or young. Only when such a site is not to be obtained in the vicinity of their chosen home is an old Hawk's or Crow's nest made use of. If this is not sufficiently bulky it is deepened by throwing out the inner and finer material, as well as the lining, should there be any. They rarely add anything to a nest, unless such feathers as fall from the body of the incubating bird can be called additions. The Barred Owl rarely builds a nest of its own; a cavity being selected the eggs are simply deposited on the rubbish, chips of decayed wood, and dried leaves which may have accumulated therein.

In the more southern parts of its range it usually commences laying in February, while in the Middle States it generally begins from about the second week in March to the first week in April. It is sometimes influenced by the condition of the weather. Even in the southern New England States, near Norwich, Connecticut, Mr. C. L. Rawson has occasionally found them nesting in February, and has taken their eggs lying on a solid cake of ice, both from holes and open nests in trees when the ground was covered with a foot of snow.

But a single brood is raised in a season. Should the first set of eggs be taken, a second, and even a third, is occasionally laid, the last generally smaller in number than the first. The female seems to attend mostly to the duties of incubation, which lasts from three to four weeks. When so engaged she is loth to leave her treasures, and occasionally has to be dislodged by force, uttering her protests either by an angry snapping of her mandibles or by a hissing noise from a limb close by.

The number of eggs laid varies from two to four; sets of three seem to predominate slightly over the smaller number, while four are rare. The U. S. National Museum collection contains a so-called set of five eggs collected in Iowa in April, 1869. In three of these specimens the holes are much larger than in the remaining two, and if really all taken at one time the first eggs were probably laid at a considerable interval from the last. Ordinarily they are deposited every third day. Like all Owls' eggs they are pure white in color, the shell is more or less granulated, slightly rough to the touch, and not very glossy. In shape they are oval or rounded oval.

The average measurement of eighty-two of these eggs is 49.5 by 42.5 millimetres; the largest specimen measures 55.5 by 44, the smallest 41 by 37.5 millimetres. The latter from a set of two (the other being of the normal size, 49 by 43 millimetres), was collected by Mr. C. L. Rawson in New London County, Connecticut, on March 29, 1890, and is really a runt egg, but contained a well formed yolk.

The type specimen, No. 20633 (Bendire collection), from a set of three, was taken by Mr. G. Peck in Black Hawk County, Iowa, March 2, 1878. It is figured on Pl. 12, Fig. 4.

## 115. Syrnium nebulosum alleni Ridgway.

FLORIDA BARRED OWL.

*Strix nebulosa alleni* Ridgway, Proceedings U. S. National Museum, III, March 27, 1880, 8.
(B —, C —, R 397*a*, C 477, U 368*a*.)

Geographical range: South Atlantic and Gulf coast region of the United States, from eastern South Carolina, Georgia, and all of Florida west to southeastern and central Texas.

The Florida Barred Owl, a slightly darker colored bird than the preceding, was first described from specimens taken in Florida, and is now known to be common in the heavily wooded bottom lands of southeastern and central Texas (Lee County), and it has also been taken at Gainesville, Cooke County, near the northern border of that State. All the Barred Owls found along the intervening Gulf coast, in the southern portions of Alabama, Mississippi, and Louisiana, south of latitude 31°, are doubtless referable to this race. Its known range has recently been likewise extended along the Atlantic coast. Mr. J. E. Benedict shot a specimen, which is now in the U. S. National Museum collection, on June 4, 1891, near Georgetown, South Carolina, in the northeastern part of the State, which is perfectly typical, and he says that this Owl is quite common in that vicinity. It may, therefore, be looked for throughout eastern Georgia and the greater portion of eastern South Carolina as well, and as these birds are constant residents wherever found it is reasonable to presume that they also breed there.

The habits of the Florida race appear to be very similar to those of the common Barred Owl; like the latter, it frequents the densest forests of the bottom lands, nesting, however, almost exclusively in hollow trees and stumps, such as oak, pine, cypress, and gum trees, while in Florida they make use occasionally of hollow cabbage palmettos, the eggs being laid on such rubbish as may be found at the bottom of the cavity or on the bare wood; open nests in trees are only used on very rare occasions. These sites are usually situated at a height of from 15 to 50 feet from the ground and rarely higher.

Dr. William L. Ralph writes me: "The Florida Barred Owl, though much less numerous now than formerly, is still very abundant in the unfrequented districts, and not uncommon even in the more settled portions of St. Johns and Putnam Counties in that State. During the first few years in which I visited these localities they were so abundant that at times—when they were mating, I think —I have heard nearly a hundred calling at once. The call notes of the Florida Barred Owl are about the same as those of the northern bird. These notes consist of three syllables, which sound like 'who,' 'ah,' and 'whack,' but they are often given in such different tones that it appears as if they uttered more. Their usual note is a loud single 'who-ah.' Where several birds are together, sometimes in the midst of almost a perfect silence, one would begin with 'who-

who-who-who, who-who-who-who-who, who-ah.' Then another would answer in the same note, and perhaps several others in turn. After this note had been given by several birds in succession, another would utter a call like 'ah-ah-ah-who-ah,' or perhaps 'who-ah, whack-whack-whack, who-oo-ah,' which would hardly be begun before others would join in successively, some uttering the first notes and some the second, until it would seem as if every tree in the neighborhood held one of these Owls. After a few seconds' continuance at its greatest height, this racket would gradually die away until there was almost a perfect silence again, which would last for a few minutes, and then the Owls would begin to call once more. I have never heard anything that could equal one of these Owl concerts of former days, and never expect to again. It was not the degree of noise that made them peculiar, for I have heard as much or more in the breeding places of water birds, but a wierdness that is indescribable. It was not a common occurrence, however, to hear so many of these birds calling together, but only at times during the mating season, and in isolated places. They are particularly active and call more on bright moonlight nights than in dark ones. It also seems as if all the eggs of these birds whose nests I have found were laid during the moonlight nights of January and February.

"This Owl is the noisiest of any with which I am familiar, much more so than its northern relative, and is oftenest heard during the mating season, rarely while incubating, and not very often during the remainder of the year. Formerly these birds were very tame, and during my first visits to this locality, some years ago, I have known them to utter their calls from the roof of the house in which I lived as unconcernedly as they do now in the most isolated swamps. They seem to be more sociable than the northern bird, but this may be only because they are more common. As with most birds of prey, they do not nest near one another, although they seem not to mind the proximity of nests occupied by other birds. They are constant residents and become just as much attached to their nesting places as do the Great Horned Owls. Like these they are most active by night, but cover a much wider range than the latter, often leaving the woods and hunting in open fields, and formerly among the houses of small settlements. From their habit of living and breeding in swamps they are called by the natives 'Swamp Owls.'

"They nearly always nest in cavities in trunks or large limbs of trees, and this, with their retiring habits, makes it rather difficult to find their nesting sites before the eggs are hatched. The cavities they choose for nesting sites are of all sizes and shapes. I have seen some so large that a person could easily stand in one of them, others so small that the birds could with difficulty squeeze through the openings, and again others so shallow that the tail of the sitting bird could be seen projecting from them. I have never known these birds to take any material to the cavities in which they nest, there being always more or less trash in these places, and this, with the feathers from the birds themselves, often makes a soft, thick, and usually a very filthy bed for the eggs to

lie on, especially after such a cavity has been used several years in succession. I have found quite a number of their nests with young in such situations, and only a single instance has come under my observation where a pair of these birds made use of an open nest, presumably one occupied the previous season by a pair of Harlan's Hawks, which were seen about this nest when it was first found on February 3, 1891. This nest was situated in a large pine tree, 62 feet from the ground, at a point where the trunk divided into several large limbs, and it was placed in the forks thereby formed. It was composed of sticks and Spanish moss, and lined with small twigs, Spanish moss, and feathers from the sitting birds It was found in a wild and desolate spot about 6½ miles south of San Mateo, the tree containing the nest standing on the edge of a small but dense cypress swamp. When examined, on February 16, two young Owls were found, one about a day, the other three days old. Both parents were seen, and the female, which was on the nest, after being driven from it, kept on returning to it.

"Another nest with eggs was found on February 17 in the hollow top of a broken cypress tree standing near the edge of a small swamp, 4½ miles south of San Mateo. The eggs, two in number, were about three-fourths incubated; they measured 53.5 by 46 and 52 by 44 millimetres. The cavity containing the eggs was 56 feet above the ground and so shallow that the tail of the sitting bird could be seen projecting from it. The parent, on being driven from the nest, hooted several times; and it was the first time I ever heard an Owl call when it had eggs. The eggs were lying on pieces of rotten wood and feathers from the birds. After the climber descended from the tree the bird returned to its nest and remained there while our party was in the neigborhood, about fifteen minutes.

"Another nest, first found on February 18, when it contained a single egg, was left until February 23, in hopes that another might be added to it, in which I was disappointed. The nesting site was a hole in the side of a cypress tree about 28 feet from the ground and about 10 inches deep. The cavity was lined with cypress bark, small twigs, rotten wood, and feathers from the sitting birds. One of the birds was driven from the nest both times it was visited, when it would alight on a tree near by, where it stayed for a little while and then disappeared from sight, remaining away during the time our party was in the vicinity. The parent of another set of two eggs, taken on the same date, remained in the hole while the eggs were being taken. These eggs were within a day or two of hatching.

"Another set of two was found February 24; one of these eggs had been incubated about six days, the other was quite fresh. These are small and measure only 47.5 by 40.4 and 47.3 by 40.6 millimetres. The nest was in a hole in the side of a very large pine tree, 21 feet from the ground. The cavity was 18 inches in diameter; the eggs were placed on the side opposite the opening, and, indeed, so were all the other eggs when the nest proper was smaller than the cavity. This nest had the bones of small mammals and

fish, together with several pine knots lying around it. The eggs were deposited on some rotten wood and feathers from the sitting birds. I think the bird which laid these eggs is a very old one, and the nest has been occupied for several years. The latest date on which I found eggs of these birds was on March 10, when a set of two fresh eggs were taken, one, of rather large size, measuring 53.3 by 42.2, the other a runt egg, which measures 39.1 by by 34.5 millimetres. I believe this to be a second laying. The runt egg contained a yolk and would probably have hatched. The site was in the hollow of a partly decayed pine stump, about 15 feet from the ground. The cavity was about 1 foot deep and 10 inches in diameter. A number of other nests of this subspecies were examined by me, most of which contained young, and the nesting sites were similar to those already described.

"I found these birds already mated on my arrival at San Mateo, on January 13, 1891, and they were making a great deal of noise every night, which they kept up until the nights began to grow dark during the last of the month, when they gradually ceased, and for about ten days previous to February 14, they were hardly heard. On that date they began calling again, though not so much as at first, and since then they have made a good deal of noise on some nights, while on others they hardly uttered a note.

"The mating season of the Florida Barred Owl begins usually about the 1st of January, perhaps a week or two earlier in some seasons, and their eggs are generally deposited during February. According to my observation they always lay one or two eggs, usually the latter number. Both sexes assist in incubation and in the care of the single brood raised. As a rule they are not very solicitous about their homes, but fully as much, if not more so, at least so far as the young are concerned, as the Great Horned Owls. The young owlets when first hatched are covered with a fluffy white down and grow rapidly. When about a week old the first pinfeathers commence to show on the wings and back, while at the age of a month they are fairly well feathered throughout, the plumage being of a very loose and soft structure; the primaries being about half the normal size, but the tail feathers are correspondingly much shorter and still hidden by the down. I believe they are able to leave the nest when about six weeks old.

"Their food consists of the smaller mammals, such as rabbits, squirrels, gophers, rats and, mice, as well as fish and crawfish, and I believe they sometimes catch snakes and frogs. They rarely capture birds or poultry, and are far more beneficial than otherwise."

In southern Florida nidification occasionally takes place in December, but more frequently in January, Mr. J. F. Menge writing me that he had found two nests with young on February 15, 1890, in the vicinity of Myers, Lee County, Florida. One of these contained a single young bird, the other two, nearly full grown and about ready to leave the nest.

In southern Louisiana Mr. G. E. Beyer found Barred Owls, which are probably referable to this race, nesting early in March, and laying from two

to four eggs, while in Lee County, Texas, according to Mr. J. A. Singley, they are the commonest Owls found in that part of the State. Here it nests usually in the latter half of February or the first week in March, and it seems to lay but two eggs, corresponding in this respect to the Florida birds. In seventeen nests found by him, none contained more than that number of eggs or young. The cavities in which these Owls nested were of various depths and dimensions, some of them fully 2 feet deep and 15 inches in diameter, others quite shallow, not over 10 inches deep. The eggs are deposited at intervals of several days, and incubation seems to begin with the first egg laid.

The eggs of the Florida Barred Owl are very similar in color and shape to those of the common Barred Owl; one of the specimens before me is a perfect ovate. The average measurement of eight eggs of this subspecies from Florida, all collected by Dr. Ralph, is 51.1 by 42.7 millimetres, the largest measuring 53.5 by 46, the smallest 47.3 by 40.6, while the average measurement of fifteen eggs of this race from Texas, is 48.5 by 41.5 millimetres., and judging from the small number of Florida specimens before me, these, in this instance at least, average larger than the eggs of the common Barred Owl.

## 116. Syrnium occidentale Xantus.

SPOTTED OWL.

*Syrnium occidentale* Xantus, Proceedings Academy Natural Sciences, Phila., 1859, 193. (B —, C 324, R 398, C 478, U 369.)

Geographical range: Highlands of Mexico; north to southern Colorado, New Mexico, Arizona, California, and Lower California.

The range of *Syrnium occidentale*, the western representative of the Barred Owl, and a somewhat darker colored bird, as far as is known at present, extends through the mountain regions of California, south to Arizona, thence east to New Mexico, and north to southern Colorado. It has also been met with in the mountains of Lower California and extends southward over the higher table-lands of Mexico to Guanajuato, latitude 21°

Mr. Xantus, one of the pioneer naturalists of the Pacific coast, discovered the Spotted Owl in the vicinity of Fort Tejon, California, in the southern Sierra Nevada Mountains, and described it in the Proceedings of the Academy of Natural Sciences of Philadelphia in 1859. This specimen remained unique until I found the bird again in the spring of 1872, in the vicinity of Whipple's Station, some 10 miles northwest of Tucson, Arizona. Since then it has been met with in other places in the West, but it does not appear to be an abundant species anywhere, except perhaps in Calaveras County, California, where Mr. L. Belding reports it common in summer and perhaps in winter. According to his observations it frequents the densest parts of the fir forests. On June 13, 1882, a male and female were shot together in the early evening.[1] Mr. R. B. Herron also obtained a specimen midway between San Diego and Riverside, in southern California in the fall of 1885.

[1] Belding's Birds of the Pacific District, 1890, p. 49.

The Spotted Owl is mainly nocturnal in its habits, and is rarely seen in the daytime. It may be much more common in suitable localities than is generally supposed, and as it seems to be almost entirely confined to the thinly settled mountain regions of the West, its present rarity is easily accounted for.

Very little is as yet known of its general habits. I accidentally stumbled on this bird and its nest while en route from Picacho Peak to my camp on Rillitto Creek, near Whipple's Station, on April 17, 1872. My attention was first drawn to the nest by one of my men, who noticed a bird sitting on it. Rapping on the trunk of the tree it flew into the branches of another close by, from which I shot it. On picking it up I supposed it to be a common Barred Owl, and only on my return to camp did I realize the prize I had secured; it was too much mutilated, however, to make a good skin. The nest appeared to me to be a new one, built by the birds themselves; it was about 30 feet from the ground and placed in a fork close to the trunk of a large and bushy cottonwood tree standing in the midst of a dense grove of younger trees of the same species. It was composed of sticks, twigs, and the dry inner bark of the cottonwood, lined with some dry grass and a few feathers. The inner cavity was about 2 inches deep, and the nest itself about the size of that of the larger Hawks. It was readily seen from below, but not easily observed a little distance away, the foliage of the tree hiding it pretty effectually. Some few weeks later I saw a pair of these birds in the same vicinity and secured another.

I several times heard the calls of what I supposed to be this species, in March of the following year, among the tall timber near my camp, and I believe the Spotted Owl is not uncommon in that part of Arizona. As near as I remember, their call notes are very similar to those of the Barred Owl, consisting of a series of continuous and far reaching hootings.

I believe it nests in cavities of trees as well as in open nests, and that like the Barred Owl, it lays from two to four eggs to a set. Nidification seems to take place in April, somewhat later than that of the latter species.

Mr. O. C. Poling writes me: "I discovered a nest and four newly hatched young of the Spotted Owl in the foothills among the oaks at the northern end of the Huachuca Mountains in Arizona. This was on May 23, 1890. Both parents were close to the nest and took little notice of me as I approached close to them. The nest was simply a large cavity in an oak about 10 feet from the ground."

The single egg before me, taken from the nest found on April 17, 1872, already mentioned, was fresh; it is oval in shape and pure white in color. The shell is slightly granulated and shows but little gloss. It measures 52 by 45.5 millimetres, and, as it is very similar to the egg of the Barred Owl, is not figured.

## 117. Scotiaptex cinerea (Gmelin).

GREAT GRAY OWL.

*Strix cinerea* Gmelin, Systema Naturæ, I, i, 1788, 291.
*Scotiaptex cinerea* Swainson, Classification of Birds, II, 1837, 217.
(B 53, C 322, R 399, C 474, U 370.)

Geographical range: Northern North America, south in winter to the northern border of the United States.

The breeding range of the Great Gray Owl is confined principally to the more northern regions of the North American continent, from the shores of Hudson Bay north to the limit of timber in about latitude 68°. It is reported common throughout the fur country and the interior of Alaska, and has also been met with by Drs. Cooper and Newberry in different parts of the Pacific coast. The former observed it near the mouth of the Columbia River in June, and obtained a specimen at the time, which would certainly indicate that it might breed in the vicinity, while the latter is said to have observed it as far south as Sacramento Valley in California, as well as in the Cascade Mountains, the Des Chutes Basin, and on the Columbia River, in Oregon. During an extended tour of duty in various parts of Oregon, Washington, and Idaho, I failed to meet with this species at any time of the year. It is more or less migratory during the winter, and much more abundantly met with along our northern border in some seasons than others. The winter of 1889–'90 was a notable instance, and quite a number of these birds were captured or seen in various parts of the New England States. Nothing new respecting the nesting habits of this Owl has been recorded within recent years.

In the "History of North American Birds," 1874 (Vol. III, pp. 32, 33), it is stated: "On the 23d of May, Dr. Richardson discovered a nest of this Owl built on the top of a lofty balsam poplar, composed of sticks with a lining of feathers. It contained three young birds covered with whitish down. * * *

"Mr. Donald Gunn writes that the Cinereous Owl is to be found both in summer and winter throughout all the country commonly known as the Hudson Bay Territory. He states that it hunts by night, preys upon rabbits and mice, and nests in tall poplar trees, usually quite early in the season."

Mr. R. MacFarlane, in his "Notes on the Land and Sea Birds of the Lower Mackenzie River District," says: "I should not say that this Owl was in 'great abundance' in the Anderson River region, as inadvertently stated on page 33, volume III, of the 'History of North American Birds.' We certainly obtained very few specimens, and we found but one nest (which is referred to in the same paragraph), on the 19th of July, 1862, near the Lockhart River on the route to Fort Good Hope; it was built on a spruce pine tree at a height of about 20 feet and was composed of twigs and mosses, thinly lined with feathers and down. It contained two eggs and two young, both of which had lately died. The female left the nest at our approach and flew to another tree at some distance, where she was shot."

From the limited information we possess about the nesting habits of this species it appears that in Alaska these birds nest sometimes as early as April, and in the interior as late as the middle of June. From two to four eggs seem to be laid to a set, and these are small for the size of the bird. The body of the Great Gray Owl is, however, much smaller than that of the Great Horned Owl, in fact but little larger than that of the Barred Owl. The long tail and the loose fluffy plumage of the bird make it look much larger than it really is.

The eggs are dull white in color with but little luster, and the shell is roughly granulated; in shape they are broad elliptical oval, not as rounded as eggs of species belonging to the genera *Syrnium* and *Bubo*.

The average measurement of nine eggs in the U. S. National Museum collection is 55 by 44 millimetres, the largest egg measuring 57 by 44.5 the smallest 53.5 by 42 millimetres.

The type specimen, No. 10277 (Pl. 12, Fig. 5), from a set of two, was collected by Mr. J. Sibbiston, near Fort Yukon, Alaska, in April, 1864.

## 118. Scotiaptex cinerea lapponica (Retzius).

LAPP OWL.

*Strix lapponica* Retzius, Fauna Suecica, 1800, 79.
*Scotiaptex cinerea lapponicum* Ridgway, Manual North American Birds, 1887, p. 260.
(B —, C —, R 399*a*, C 475, U 370*a*.)

Geographical range: Northern portions of Europe and Asia, straggling to western Alaska (shores of Norton Sound).

The Lapp Owl, a lighter colored bird than the Great Gray Owl, claims a place in our avifauna on the strength of a single specimen, an adult female, brought to Mr. L. M. Turner, from the Yukon Delta, April 15, 1876, while he was on duty as United States Signal observer at St. Michael, Alaska. It was said to be quite rare, but he failed to learn anything regarding its habits, and it may, possibly, breed in small numbers in the northern portions of Alaska.

Dresser, in speaking of this species, says: "This, one of the rarest of the Owls inhabiting the Palæarctic region, is almost entirely confined to the more boreal districts, where it is a resident in the upper portions of the forest belt, but rarely straggling down into the northern parts of central Europe. * * *

"The first published notice of the breeding of the present species appears to be that communicated by Mr. C. G. Löwenhjelm, who states (K. Vet. Ak. Handl. 1843, p. 389) that 'the nest was in a dense pine wood on a stump, about 3 ells high, in the top of which a hollow had been formed by the wood having rotted. In the nest was one white egg about the size of that of the Eagle Owl; and at the foot of the stump another egg was on some moss, quite uninjured.'

"Subsequently, Mr. Wolley obtained its eggs in Kemi Lappmark in 1856, and says (Oöth. Wolleyana, p. 173) that 'the nest was on the top of a broken trunk of a Scotch fir, the main part of which hung down; but from the description, Piety thinks there was some old nest there. He does not remember seeing any nest made. It was not high up, some 2 fathoms, perhaps; but those which he has seen before were not more than 1 fathom high. The top of the tree where it was broken off was not level, but it had a great splinter on one side. The birds are very bold at the nest and the cry of the cock attracts people to the nest. The cry is three notes drawn out, the first hardest, the second lighter and short, the third lightest and longest of all, "hu, hu, hu-u-u."' Another nest, taken at Muoniovara on the 5th of April, 1857, was, he adds, 'made of sticks and all kinds of stuff inside, about $3\frac{1}{2}$ fathoms high up in a large Scotch fir, where it is divided into several great forks.' It was not like a new nest, and he describes it 'as about 2 feet in thickness.'

"I possess several eggs of this Owl received from Mr. Wolley's collectors in Lapland, which are pure white and resemble the eggs of the Snowy Owl, but appear a trifle less smooth on the surface of the shell. In size they vary from $2\frac{1}{40}$ by $1\frac{27}{40}$ to $2\frac{5}{40}$ by $1\frac{29}{40}$ inches [equal to about 51.5 by 42.7 and 54 by 43.9 millimetres]."[1]

The number of eggs laid at a clutch is not stated, but is probably from two to four.

A set of two eggs, No. 5322, U. S. National Museum collection, taken in 1861, near Tepasto, Finland, were presented to the Museum by the eminent English naturalist, Mr. A. Newton. These specimens are nearly oval in shape, pure white in color, slightly glossy, and the shell is roughly granulated. They measure 51 by 43.5 and 51.5 by 42 millimetres. None of the eggs are figured, as they resemble those of the preceding species very closely, except that they are a little smaller.

## 119. Nyctala tengmalmi richardsoni (Bonaparte).

RICHARDSON'S OWL.

*Nyctale richardsoni* Bonaparte, Geographical and Comparative List, 1838, 7.
*Nyctale tengmalmi* var. *richardsoni* Ridgway, American Naturalist, VI, 1872, 283.
(B 55, C 327, R 400, C 482, U 371.)

Geographical range: Northern North America; south, in winter, to northern border of the United States.

The little Richardson's Owl is an inhabitant of the more boreal portions of the North American continent, and, with the exception of Alaska, breeds, as far as known at present, only north of the United States. Even in winter

[1] Dresser's History of the Birds of Europe, Vol. v, pp. 282, 283.

it must be considered as rather a rare visitor to our borders. Mr. Charles B. Cory reports it as breeding on the Magdalene Islands, Gulf of St. Lawrence, and Mr. Thompson gives it as resident in Manitoba.[1]

In eastern North America it is possibly a very rare resident from latitude 46° N., and northward, becoming more abundant as higher latitudes are reached. In the interior it is reported as common on the banks of the Saskatchewan, in latitude 53°, and reaches thence northward at least to Fort Simpson on the Mackenzie River, and its range is doubtless coextensive with the timber belt. It appears to be very common about Great Slave Lake, specimens having been received from all the different Hudson Bay Company posts located on its shores.

Mr. R. MacFarlane states: "This Owl, or a bird closely answering to the description, was repeatedly observed in the country between Fort Good Hope and the Anderson River, Arctic America."

Mr. Dall obtained a female specimen of this Owl at Nulato, Alaska, April 28, where it was not uncommon. It was often heard crying in the evenings almost like a human being, and was quite fearless. It could be readily taken in the hand without its making any attempt to fly away, but it had a habit of biting viciously. According to the Indians it generally nests in holes in dead trees, and lays six spherical white eggs.[2]

From the foregoing accounts it appears to have pretty much the same habits as its near relative, *Nyctale acadica*. I have picked up one of these birds while perched in a wild rose thicket near Camp Harney, Oregon. It was fat and in a fine condition, and did not appear to see me approaching. Several others were caught by some of my men under similar circumstances, and I can only attribute it to their poor eyesight during the daytime. From its strictly nocturnal habits as well as its small size it is very apt to be overlooked, even in localities where it may be rather common. It is a hardy bird and well adapted to endure excessive cold.

Nelson says of Richardson's Owl: "In one instance, while at the Yukon mouth, I heard them uttering a peculiar grating cry on a cloudy morning in the middle of May. A fur trader from Kotlick brought me a set of four fresh eggs of this bird, taken from a nest in a bush near the Yukon mouth on the 1st of June. These eggs were white and round, as are most Owls' eggs. The man who brought them unfortunately neglected to bring the nest, but he told me that it was rather a small structure of twigs and grass. It was probably a deserted nest of the common Rusty Blackbird or of the Gray-cheeked Thrush, both of which nest commonly in that vicinity. The eggs were found in the midst of a dense thicket.

"Dall and others tell us that this bird generally nests in a hole in a tree, but the lack of trees at the Yukon mouth and the presence of bushy thickets may lead this bird to even build a nest for itself, and the fur trader insisted that the eggs above mentioned were in a nest of the bird's own construction."[3]

[1] Chamberlain's Canadian Birds, 1887, p. 61.
[2] History of North American Birds, 1874, Vol. III, p. 42.
[3] Report of Natural History Collections made in Alaska, 1887, No. 3, p. 151.

Three of the eggs referred to by Mr. Nelson are now in the U. S. National Museum collection, and measure, respectively, 39 by 32.5, 39 by 31.5, and 38.5 by 32.5 millimetres.

The eggs of the Old World form, *Nyctale tengmalmi*, a species closely related to Richardson's Owl, but a trifle lighter colored, and which, like the Lapp and Hawk Owls, is also likely to occur in Alaska, measure, according to Seebohm, from 31.7 to 33 millimetres in length and from 26.6 to 27.9 millimetres in breadth. There should be little or no difference in the relative size of the eggs of these birds. Like ours, Tengmalm's Owl is principally confined to timbered regions, and is said to nest in natural hollows of trees or the excavations of the Black Woodpecker.

The information obtained by Dall from Indians, whose testimony is not usually very reliable, is in this instance probably entirely correct, and I think if, as Mr. B. R. Ross states, this Owl nests in trees "that is, in an open nest," it will be found the exception and not the rule.

The only genuine eggs of Richardson's Owl in the U. S. National Museum collection are three collected by Mr. Ross, at Fort Simpson on the Mackenzie River, in latitude 62° N., on May 4, 1861. As there appear to be no memoranda showing the exact manner in which these eggs were obtained by him, it is likely that they were either taken from a cavity in, or from an open nest on, a tree.

The eggs described by Mr. Nelson, and previously referred to, are unquestionably those of the American Hawk Owl; they are absolutely indistinguishable and altogether too large for the species under consideration. How close they come to the eggs of the former will be seen by a comparison of the average measurement of thirty-two specimens now in the U. S. National Museum collection, which is 39.5 by 31.5 millimetres.

Seebohm, in speaking of Tengmalm's Owl, says: "This bird is a very early breeder, and even in latitude 67° N., Wheelwright's eggs were all taken between the 2d and 13th of May; whilst at Muoniovara, a degree still farther to the north, Wolley obtained eggs between the 18th of May and 2d of June, and received them from a little farther north between the 1st and 27th of June. Wheelwright describes its call note as a very musical soft whistle, never heard except in the evening and at night. Its food consists of mice, beetles, and small birds."[1]

Like the preceding, Richardson's Owl is an early breeder and nests probably at about the same time in corresponding latitudes. The number of eggs laid is likely the same, from three to seven. These are pure white in color, oval in shape; the shell is smooth, close grained, and shows but little luster.

The three specimens in the U. S. National Museum collection measure, respectively, 33 by 27.5, 32 by 27.5, and 31 by 27 millimetres.

The type, No. 5098 (Pl. 12, Fig. 6), is one of the above mentioned specimens.

[1] History of British Birds, Seebohm, 1883, Vol. I, pp. 164, 165.

## 120. Nyctala acadica (Gmelin).

SAW-WHET OWL.

*Strix acadica* Gmelin, Systema Naturæ, I, 1788, 296.
*Nyctale acadica* Bonaparte, Geographical and Comparative List, 1838, 7.
(B 56, 57, C 328, R 401, C 483, U 372.)

Geographical range: Northern United States and British provinces, rarely south of 40° in eastern portions, but in mountainous western districts south to southern Mexico.

The breeding range of the Saw-whet or Acadian Owl, so far as known, extends east of the Mississippi Valley through the northern portions of the United States from about latitude 40° (Carroll County, Indiana), through the southern parts of the Dominion of Canada to latitude 51° 30′ (Moose Factory), near the southern shores of James Bay. In the central Rocky Mountain region it ranges south to at least latitude 35° in northern New Mexico and Arizona, and on the Pacific coast north through the mountains of California, Nevada, Idaho, Oregon, and Washington into British Columbia; it probably breeds throughout all the higher mountain ranges of western North America.

It is more than probable that it will yet be found breeding throughout the more mountainous regions of eastern North America south of latitude 40°, but on account of its small size as well as its nocturnal habits it is seldom noticed, and while it may be rather irregularly distributed and even entirely absent in certain localities, it is nevertheless a far more common species than is generally supposed. It is a constant resident throughout the greater portion of its range within the United States, only migrating from its more northern breeding grounds, and passing the winter season mainly in the Middle States, where it is met with at times in considerable numbers. Mr. W. E. D. Scott took not less than twenty-one specimens during December, 1878, in a cedar grove on a side hill with a southerly exposure, near Princeton, New Jersey. He found some of them very tame and unsuspicious, allowing themselves to be taken by hand; I have also found them equally stupid in the vicinity of Camp Harney, Oregon. Each winter one or more specimens were brought to me alive by some of my men, who found them sitting in the shrubbery bordering a little creek directly in rear of their quarters, where they usually allowed themselves to be taken without making any effort to escape. I thought at first that they were possibly starved, and on that account too weak to fly, but on examination found them mostly in good condition and fairly fat. They seem to be especially fond of dense evergreen thickets in swampy places or near water courses.

Although the little Saw-whet Owl seems to be exceedingly gentle in captivity and of an amiable disposition, it does not appear to lack strength or courage, and is able to capture and kill rodents considerably larger than itself. Mr. George G. Cantwell informs me that he found a nest of this species in a small hollow white oak tree, the cavity, which had evidently been an old squirrel's nest, being filled with leaves and other trash to within a few inches of the entrance, which was about 15 feet up. The tree stood in the midst of a dense piece of timber bordering a small lake near Minneapolis, Minnesota. This nest contained on June 1, 1885, four young owlets of different ages and an addled egg, as well as portions of two rats. Mice and other small rodents appear to furnish the principal part of its food, and occasionally a bird is captured. No doubt frogs and insects of various kinds are fed on as well. This bird must certainly be counted among the beneficial species and deserves protection. It seeks its humble prey mostly by night, while the days are passed in hollows in trees or in the gloomiest and darkest portions of the forests.

It is only within the last ten years that anything reliable has been learned about the nesting habits of this species, or fully identified eggs been taken, and perhaps none are better qualified to speak of the nesting habits of these quaint and interesting little Owls than Dr. William L. Ralph and Mr. Egbert Bagg of Utica, New York, who have devoted considerable time to the study of these birds and have taken five sets of their eggs. The former writes me as follows: "We found these birds quite common in Oneida County, New York, especially in the northern and eastern parts. Their nests are not very hard to find, and it seems strange that so few have been taken. Those found by Mr. Bagg and myself were all in the deserted holes of Woodpeckers and the eggs were laid on the fine chips found in such burrows without much of an attempt at making a nest. They were all in woods, wholly or in part swampy, such situations being particularly congenial to these birds, who usually frequent them throughout the year.

"Just before and during the mating season these little Owls are quite lively; their peculiar whistle can be heard in almost any suitable wood, and one may by imitating it often decoy them within reach of the hand. Upon one occasion, when my assistant was imitating one, it alighted on the fur cap of a friend that stood near him. They may often be seen at this season during the day sitting in trees or bushes and sometimes even hunting; but after their eggs are laid they are usually if not always silent, and are then very hard to find, as they keep in holes most of the time, except during the night. They are not at all suspicious and I have more than once stroked one with my hand as it was roosting sleepily in some bush or tree.

"Their call is a frequently repeated whistle, sometimes uttered in a high and again in a low key, and given in either a slow or rapid cadence. Generally it is commenced slowly and gradually becomes faster and faster

till it ends quite rapidly. This call, which is the only one I have ever heard them give, sounds not unlike the noise made during the operation of filing a saw, and it is easily imitated.

"Both sexes, I think, assist in incubation, and the only apparent concern they show when their eggs or young are disturbed is the persistency with which they cling to their nests. They are constant residents of this county and seem not to decrease any in numbers. I have often found mice of different species and sometimes moles in and about their nests, but never any other kind of food.

"The first nest was taken near Holland Patent, New York, on April 7, 1886. It was situated 22 feet above the ground in a dead maple stump, and contained seven eggs ranging from fresh to slightly incubated. The second was found near the same place on April 21, 1886, also in a dead stump 40 feet above ground. It contained five young birds and an egg on the point of hatching. The third was found on the same day near Trenton Falls, New York, likewise in a dead stump 20 feet above the ground. It contained seven eggs which were heavily incubated. The fourth was found at Gang Mills, Herkimer County, New York, April 30, 1886, in a dead stump 50 feet above ground, and likewise contained seven eggs on the point of hatching. The fifth and last was taken near Holland Patent, New York, April 30, 1889, and was situated in the dead top of a maple tree 63 feet above the ground, and contained four eggs ranging from fresh to slightly incubated. I believe they lay their eggs at intervals of about two days."

Mr. William Brewster mentions the acquisition of a fully identified set of these eggs, taken by Mr. W. Perham, at Tyngsboro, Massachusetts, April 5, 1881, who, he says, takes many eggs of the Mottled Owl by hanging up artificial nests in suitable places in the woods. These nests are made from sections of hollow trunks boarded up at the open ends, with entrance holes cut in the sides, and the Owls apparently find them quite to their taste, for they freely appropriate them, both as roosting and nesting places. Sometime late in March of the above mentioned year a pair of Saw-whets took possession of one which was nailed against the trunk of an oak in an extensive piece of woodland. No nest was made, the eggs being simply laid on a few leaves which squirrels had taken in during the winter. There were four eggs on April 4, and, as the number was not increased, the following day Mr. Perham decided that the set was complete and accordingly took the parent birds with their clutch. He writes me that he made many unsuccessful attempts to catch the female on her eggs. She invariably flew out when he began to climb the tree, and he was at length obliged to shoot her. This behavior is strikingly different from that of the Mottled Owl under similar circumstances, for the sitting female of the latter species can always be taken off her nest by hand,

and even when pulled out of the hole rarely makes any attempt to escape. The male Saw-whet was shot while sitting on a branch near the nesting hole.[1]

In the same number of the Nuttall Bulletin, page 185, Mr. N. A. Francis, of Brookline, Massachusetts, makes the following statement: "On June 4, 1880, I found a nest of the Acadian Owl (*Nyctale acadica*), containing five nearly fledged young, in a cedar tree, in the midst of a dense swamp in Braintree. The nest was an old one of a Night Heron, repaired with a few leaves and feathers. Close to this nest of the Acadian Owl was found one belonging to a Long-eared Owl."

The little Saw-whet is not uncommon in the southern Rocky Mountains in Colorado, where Mr. Denis Gale found it nesting near Gold Hill, and Mr. William G. Smith in Estes Park. It does not appear to breed as early there as in the East, and the usual number of eggs laid by it is also less. Their nests were all found in abandoned Woodpecker excavations in old cottonwood trees, among the dense thickets along the water courses, and situated from 10 to 30 feet from the ground. The number of eggs or young averaged from three to five, never more.

Mr. Gale says that when disturbed in its nest it utters occasionally a peculiar cry, very similar to that of a startled Robin. Its food seemed to consist of mice and other small rodents, and no feathers were found in any of the cavities examined by him. He thinks that incubation lasts about three weeks, and that the eggs are covered continuously from the time the first one is laid, and are deposited at intervals of two or three days. In a set of three eggs taken June 3, one was fresh, the other two containing embryos in different stages of development. A second nest, found early in July, contained three young of different ages and two sterile eggs. The eldest young, which was more than half feathered, had a uniform chestnut colored breast. Mr. Gale raised these birds, and after they had attained their growth kindly presented them to me. They are deposited in the zoölogical collection now forming in Washington, District of Columbia, and attract considerable attention. They are cleanly, amiable creatures, and make exceedingly interesting pets, performing all sorts of curious antics in the early evening and throughout the night, while during the day they are rather sleepy and quiet, and sit close together in their cage.

Mr. W. G. Smith found a nest of this species in a gloomy ravine near water at an altitude of about 7,000 feet, on June 6, 1890. The eggs, four in number, were partly incubated and placed in a hole in an old cottonwood stump about 10 feet high and 8 inches from the aperture. The nesting material was scant and consisted of a few domestic chicken feathers. The female flew out when disturbed and was secured; the male was not seen. On June 8 he found a second nest containing three young birds already well feathered and within a mile of the former site and in a similar location; it appeared to be an old squirrel's nest.

[1] Bulletin Nuttall Ornithological Club, Vol. VI, July, 1881, pp. 143, 144.

One of my men also found a nest in the Blue Mountains, near Camp Harney, Oregon, May 2, 1881. The nest was in a deserted Woodpecker's hole in a pine stump standing in a dense thicket of young pines on the side of a cañon, and contained five nearly fresh eggs. The hole was 8 feet from the ground and about 10 inches deep, the eggs lying on the rubbish in the bottom of the cavity; the female was at home and was secured.

From the foregoing it appears that the Saw-whet Owl usually nests in hollow trees, in old squirrels' nests, or in the abandoned excavations of Woodpeckers, occasionally in artificial nests, as well as in open ones. Such instances as the latter are probably of rare occurrence, however.

The number of eggs laid to a set varies from three to seven, the latter number appearing to prevail in northern New York, where nidification usually commences early in April, while in the West, where the sets of eggs range only from three to five, the nesting season seems to commence either late in May or the beginning of June.

The eggs are pure white in color, with little or no gloss, usually oval in shape, and occasionally a set is found that is slightly ovate.

The average measurement of thirty specimens in the U. S. National Museum collection is 30 by 25 millimetres, the largest egg measuring 31 by 25, the smallest 29 by 25 millimetres.

The egg described in the "History of North American Birds," (Vol. III, p. 47), No. 14538, U. S. National Museum collection, and said to have been taken by R. Christ, Nazareth, Pennsylvania, April 25, 1867, is certainly not an egg of the Saw-whet Owl, being much smaller, very glossy, and measuring only 24 by 21.5 millimetres. From the texture of the shell I should call it a Woodpecker's egg.

The type specimen, No. 23889 (Pl. 12, Fig. 7), from a set of three eggs, was taken June 5, 1889, by Mr. Denis Gale near Gold Hill, Boulder County, Colorado.

## 121. Megascops asio (Linnæus).

SCREECH OWL.

*Strix asio* Linnæus, Systema Naturæ, ed. 10, I, 1758, 92.
*Megascops asio* Stejneger, Auk, II, April, 1885, 184.
(B 49, part, C 318, R 402, C 465, U 373.

Geographical range: Eastern United States and the southern border of the British provinces, except lower portions of the South Atlantic and Gulf States; west to the Great Plai s.

The breeding range of the common Screech Owl, also known as the Mottled and sometimes, according to its plumage, as the Red or Gray Owl, extends through the eastern United States, west to middle Louisiana, excepting southern South Carolina, southern Georgia, all of Florida and the Gulf coast, where it is replaced by the slightly smaller Florida Screech Owl. North

and West it ranges well into the Great Plains, having been taken in central Texas at Long Point, and it is reported as abundant in Kansas, not uncommon in Nebraska, and has been met with near Vermillion, Clay County, South Dakota, where it is said to be rare. In northern Minnesota and northern Maine it is rather rare; it is also found along the southern border of the Dominion of Canada. Mr. T. McIlwraith, in his "Birds of Ontario," says: "It is the most abundant of the Owls in this part of the country, yet, like the others, it is of very irregular occurrence. I have met with it once or twice in the woods in summer, but it is most frequently seen in winter when the ground is covered with snow."

Mr. M. Chamberlain, in his "Catalogue of Canadian Birds," says: "It occurs from Lake Huron to the Atlantic, though rare in the maritime provinces." Professor Macoun reports having taken one example, at Birtle, in northwestern Manitoba, in about latitude 50° 30′; but I believe this specimen is more likely to be *Megascops asio maxwelliæ*.

It is well known that the Screech Owl is subject to two distinct variations of plumage, the rufous and the gray, and young birds in both phases are often found in the same nest, even when the parents are of the same color. It is not as yet well understood to what this difference in coloration is due; certain climatological conditions may, however, be a considerable factor. While in some sections the two phases are nearly equally common, in others one or the other predominates. From what I have been able to ascertain it appears that the rufous phase is most frequently found in the Mississippi Valley, while the reverse seems to be the case near the Atlantic seacoast.

The Screech Owl is strictly nocturnal in its habits and is rarely seen in the daytime, which it passes in a hollow tree or in some dense thicket which the sunlight rarely penetrates. From such retreats it is often flushed by the attacks of the Blue Jay, which is the bane of its existence, and by other birds as well, which annoy it persistently wherever met with and generally cause it to seek safety in flight. The attention of the collector is often drawn to it by the noisy scoldings heard at such times.

It is a constant resident wherever found. Although often living in the immediate vicinity of farmhouses (old orchards being especially favored by them), yet on account of its retiring and unobtrusive habits it is seldom seen during the greater part of the year, though often enough heard in the early evenings throughout the mating season, when its doleful call notes are sure to be heard. In the winter when snow covers the ground, the trees denuded of their foliage, and food is scarce in the forests, many of these Owls that spent the summer in such localities now seek some dark and secluded nook in the outbuildings, corncribs, and haylofts about farmhouses in the vicinity, and are then more readily observed.

The Screech Owl, although considered by not a few superstitious and illiterate persons as a bird of ill omen, portending bad luck to the people whose home it frequents, is one of the most profitable and useful birds a

farmer can have about his place, as it lives almost exclusively on mice and other rodents, of which it destroys large numbers yearly, and noxious insects as well, seldom molesting a bird of any kind, and occasionally fish, crawfish, and frogs are also eaten. One of these birds kept in confinement by Mr. O. B. Zimmermann seemed to be fond of caterpillars. The indigestible portions of the food used, such as bones and the fur of the rodents killed, are thrown up in the shape of pellets about eight hours after having been eaten.

I could not, if I wished, describe their call notes. It is beyond my ability to do justice to them on paper; the words "lugubrious" and "uncanny" express their sound as well as any, and it is mainly these doleful moans which prejudice many otherwise intelligent persons against these useful birds. Sometimes, however, their notes are rather clear and soft and not unpleasant.

I believe the Screech Owl remains paired through life. The mating period begins usually about the 1st of March, occasionally a little earlier or later, according to the season.

Mr. Lynds Jones, of Grinnell, Iowa, writes me: "I saw this species mating once. The female was perched in a dark leafy tree apparently oblivious of the presence of her mate, who made frantic efforts through a series of bowings, wing-raisings, and snappings to attract her attention. These antics were continued for some time, varied by hops from branch to branch near her, accompanied by that forlorn, almost despairing wink peculiar to this bird. Once or twice I thought I detected sounds of inward groanings, as he, beside himself with his unsuccessful approaches, sat in utter dejection. At last his mistress lowered her haughty head, looked at and approached him. I did not stay to see the sequel."

In the southern and central parts of its range nidification begins about the latter half of March or the first part of April; in the New England and Northern States, usually somewhat later, between the middle of April and the beginning of May.

The nesting site chosen is nearly always a hollow in a tree, either an abandoned Woodpecker's hole, or oftener a natural cavity, varying in height from 3 to 40 feet from the ground, usually at distances from 10 to 20 feet up. Occasionally it nests in boxes nailed up in trees or in some dark corner under the eaves of a barn or outbuilding, in dovecots, etc. Hollow apple trees and oaks seem to be favorite sites with them, and in Kansas and Nebraska, cottonwoods. Mr. Oliver Davie mentions his having found several nests between the broken siding of ice houses along streams. Mr. C. S. Brimley found a set of three eggs of this species placed in a cavity of a stump, the bottom of which was below the level of the ground outside; they were taken on April 27, 1885, and were much incubated when found.

Strictly speaking, the Screech Owl makes no nest, the eggs being laid in the bottom of the cavity on such rubbish as naturally accumulates therein, such as bits of rotten wood, a few dry leaves, and the feathers dropped from

the birds during incubation. Four or five eggs are usually laid to a set, and occasionally six, and even seven are sometimes found, but the latter number is rare. Mr. Oliver Davie, in his "Nests and Eggs of North American Birds, 1889," page 196, states that they frequently lay eight, rarely nine, and says that in April, 1885, a farmer brought him nine young, with the parent birds, which he had taken from a hollow tree. The largest set I have any knowledge of, or have been able to fully verify, is one of seven. These eggs were slightly incubated when found and were taken by Mr. W. E. D. Scott, near New Brunswick, New Jersey, April 11, 1879.

Mr. Lynds Jones writes me: "Both parents are generally found near the nest, and not infrequently sitting on the eggs at the same time. In a number of instances I have taken the two from well incubated eggs, but have never flushed both from a fresh set. Between the interval when the first egg is laid and the set is completed, the male may be found in a hollow tree near by and cannot be flushed, while the female watches the nest and flushes easily. When incubation begins the male will flush readily for a time, the female, however, remaining. Later, both birds must be dislodged by force. If the cavity is large enough to admit of it, both birds will lie over the eggs; if, however, it be small, the female covers the eggs and the male either wedges himself down by her side or lies on top of her, and sometimes finds a lodgment somewhere higher up in the hole, which, however, is rarely the case."

When suddenly disturbed in their hole they frequently utter a hissing noise and snap their mandibles together, producing a kind of rattling sound. In disposition these birds are rather unsociable, seldom more than a pair being seen together at any time, except when still caring for their young in the summer and early fall.

Incubation lasts about three weeks, or perhaps a few days longer. The young, according to Mr. Lynds Jones, are blind when first hatched, and soon develop an astonishing appetite, keeping both parents busy to provide the needed food for the rapidly growing family. The foraging is done almost entirely after sundown and throughout the night, and a supply of food to last during the day is usually stored away in their nesting site. Their flight is noiseless and easy, enabling them to drop down silently and quietly on their unsuspecting victims.

Though small, the Screech Owl does not lack courage, and will frequently attack animals much larger and heavier than itself, and has been known to kill large rats.

Mr. J. L. Davidson publishes the following remarkable incident in Forest and Stream of March 19, 1885:

"Lockport, New York, *February* 26.

"On Saturday last I received a box containing a live Screech Owl (*Scops asio*), from a young farmer friend, and on Tuesday received the following letter from him:

'Friday morning I found a large Plymouth Rock rooster with his head and neck badly torn and covered with blood, and, after some search, I saw a small Owl up in the barn. I caught it and found fresh blood on the feathers around its beak. To be sure it was the Owl that did the mischief, I put both the fowl and the bird in a darkened place and was at once treated to a surprise, for the Owl flew at the cock and lit on his neck, and began to pick at his head in a very furious manner. Being sure that I had the culprit, I boxed it up and sent it to you. The rooster weighed 9 pounds alive, rather large prey for such a small bird.'"

They are easily tamed and make rather amusing pets, are cleanly in their habits, and very fond of bathing.

The eggs of the Screech Owl are pure white in color, usually oval or nearly globular in shape, and moderately glossy. In the majority of specimens the shell is smooth and finely granulated, while in a few it is rough to the touch. They are deposited at intervals of a day or two.

The average measurement of fifty-six specimens in the U. S. National Museum collection is 35.5 by 30 millimetres, the largest egg of the series measuring 38 by 31, the smallest 32 by 29.5 millimetres.

The type specimen, No. 20571 (Pl. 12, Fig. 8), selected from a set of four, Bendire collection, was taken near Orange, New Jersey, April 20, 1875.

## 122. Megascops asio floridanus (Ridgway).

FLORIDA SCREECH OWL.

*Scops asio* var. *floridanus* Ridgway, Bulletin Essex Institute, December, 1873, 200.
*Megascops asio floridanus* Stejneger, Auk, II, April, 1885, 184.
(B —, C 318*c*, R 402*a*, C 469, U 373*a*.)

Geographical range: Southern South Carolina and Georgia, Florida and the Gulf coast to southern Louisiana.

The breeding range of the Florida Screech Owl, a much darker and smaller bird than the preceding, and like it, found in both the red and gray phases of plumage, extends from southern South Carolina, southern Georgia and Florida, westward along the Gulf coast to southern Louisiana, where, according to Dr. A. K. Fisher, it is not uncommon in the vicinity of New Orleans. A Screech Owl has also been reported as breeding at Houma, Terre Bonne County, Louisiana, which is unquestionably referable to this race, and it probably reaches west to southern Texas. It is a constant resident wherever found.

The general habits of the Florida Screech Owl are similar to those of the preceding subspecies. Like it, it never constructs a nest of its own, but lays its eggs in the abandoned excavations of the larger Woodpeckers or in natural hollows in trees, old stumps, cabbage palmettos, and occasionally in a dovecot, and in the latter case usually dispossessing the rightful owners.

Dr William L. Ralph says: "They are not at all particular as to the height at which they nest. I have found them occupying holes anywhere from 8 to 80 feet from the ground. They nest frequently in rotten stumps at such heights as to make it dangerous, if not impossible, to reach them. I remember one pair that nested near the house where I boarded, in a hole at least 80 feet above the ground, near the top of a very large rotten stump which towered above the tops of a clump of trees among which it was standing. Every time during the breeding seasons of two years that I would go near this stump one of the pair, whichever might be sitting, would look out of the hole in a most provoking manner, for I wanted a set of eggs of this subspecies very much at that time, but the stump was not climable. Usually it is a hard matter to make these birds show themselves; this pair, however, seemed to know that they were perfectly safe, and never hesitated to make their appearance.

"Like the northern Screech Owls, they utter their call notes with a peculiar tremulous sound, which is hard to describe, and from which they get their local name of 'Shivering Owls.' They feed on mice, moles, insects, and other small members of the animal kingdom.

"The mating season of the Florida Screech Owl begins sometime in March, usually in the first half of the month, and their eggs are deposited in April, generally between the 10th and 20th. I found my first nest April 29, 1883, near San Mateo, Florida, in a rotten stump, in a hole 8 feet above the ground. The hole was 8 inches deep, and the two about half incubated eggs which it contained were deposited on a few rotten chips, leaves, and feathers that had collected in it. The bird on the nest was taken from it by hand, in fact I could not get it to leave in any other way. It was a male in the red plumage, and its mate was not seen. A second nest, found on May 6, 1884, in the same vicinity, was in a pine stump, and the cavity was about 12 inches deep and 8 feet above the ground. It contained three eggs well advanced in incubation. The parent had to be taken out by force; it was in the gray plumage, sex unknown, and its mate not seen."

In southern Florida (near Myers, Lee County), Mr. J. F. Menge found the Florida Screech Owl nesting sometimes as early as March 1. He says: "They feed their young to a great extent on lizards and grasshoppers, like the Florida Burrowing Owl."

From two to four eggs are laid to a set, three being most often found, and as far as known but a single brood is raised in a season. Both sexes assist in incubation. The eggs are similar in color and shape to those of the common Screech Owl, but average somewhat smaller. Occasionally an egg is found which is almost spherical.

The average measurement of ten eggs in the U. S. National Museum collection is 32.5 by 28.3 millimetres. The largest of these eggs measures 34 by 29.5, the smallest 32 by 27.5 millimetres. One nearly round measures 31 by 29 millimetres. None of these eggs are figured.

## 123. Megascops asio mccallii (Cassin).

TEXAN SCREECH OWL.

*Scops mccallii* Cassin, Illustrated Birds of California, Texas, etc., July, 1854, 184.
*Megascops asio maccalli* Stejneger, Auk, II, April, 1885, 184.
(B 50, C 318*b*, R 402*b*, C 468, U 373*b*.)

Geographical range: Southern Texas and eastern Mexico; south to Guatemala.

The Texan Screech Owl, a slightly smaller race than *Megascops asio*, and, like this, found in both the red and gray phases, is, according to Mr. R. Ridgway, distinguishable from the latter in having the light mottlings on upper parts much coarser and more conspicuous. It is a resident of the semi-tropical portions of southern Texas, especially of the valley of the Lower Rio Grande, and eastern Mexico, and breeds wherever found.

But little is as yet known about the general habits and food of this form, but they are doubtless very similar to those of the rest of this genus. Like them it breeds in cavities in trees and lays from two to five eggs. Mr. George B. Sennett found a nest of this race on April 23, 1877, situated in a dead stub, about 9 inches in diameter, and so weak and rotten that it could easily have been pushed over; it contained three fresh eggs; location about 4 miles from Hidalgo, up the river and within about one-fourth of a mile of its banks.[1] Another set of five eggs found about April 1, 1878, were sent to him by Mr. Bourbois, who took them from a nest on his ranch at Lomita.

Dr. James C. Merrill, assistant surgeon U. S. Army, says with reference to this Owl: "Common resident. Near Hidalgo on May 6, I captured a female of this race on her nest in an old hollow stump about 5 feet from the ground. There were two eggs nearly hatched, placed on a few chips at the bottom of the hole."[2]

There seems to be no especial difference in the time of nidification, and the eggs of the Texan Screech Owl are similar in every respect to those of the common form, excepting that they are a trifle smaller.

The average measurement of twelve specimens of this race in the U. S. National Museum collection is 33.5 by 29 millimetres, the largest egg measuring 35.5 by 30 the smallest 32.5 by 28 millimetres. No specimen has been figured.

[1] Bulletin U. S. Geological Survey, 1878, p. 40.
[2] Proceedings of the U. S. National Museum, Vol. I, 1878, p. 151.

## 124. Megascops asio bendirei (Brewster).

CALIFORNIA SCREECH OWL.

*Scops asio bendirei* Brewster, Bulletin Nuttall Ornithological Club, VII, January, 1882, 31.

*Megascops asio bendirei* Stejneger, Auk, II, April, 1885, 184.

(B —, C —, R —, C —, U 373*c*.)

Geographical range: California.

The range of the California Screech Owl, a brownish gray and somewhat larger bird than any of the preceding races of *Megascops*, and only found in this phase, is confined, so far as known, to the State of California, and principally if not wholly to that portion lying west of the Sierra Nevada Mountains. It has also been reported from southwestern Oregon, but I believe that the birds found there, and even those of the coast regions of northern California, in Del Norte and Humboldt Counties, are not typical, but intermediate between this race and *Megascops asio saturatus*, a new subspecies recently described by Mr. William Brewster in The Auk (Vol. VIII, April, 1891, p. 141). Our present knowledge regarding these different subspecies is still too limited to define their ranges with any degree of accuracy. It is well known that a Screech Owl is also found on the peninsula of Lower California that has not as yet been fully identified, though it may prove to be this form, but is much more likely to be *Megascops asio trichopsis*, or a new race. They are constant residents and breed wherever found.

Their general habits are essentially like those of the eastern Screech Owls, except that, according to Mr. Charles A. Allen, of Nicasio, Marin County, California, their call notes are slightly different and more prolonged. He also informs me that they are very fond of a cold bath in the early mornings, and literally soak themselves, and that he has shot them in the act. He also says they are the commonest Owl in that vicinity.

Mr. W. Otto Emerson, of Haywards, California, nailed some boxes up in a small grove of Australian gum trees on March 14, 1885. Examining these on April 10, he found one occupied by a pair of these Owls which contained two eggs, the parent flushing and flying into a tree close by. Two days later another egg had been laid, but no more were deposited after that date. Incubation, he says, did not commence until the 17th. The male was only seen once during incubation, when he appeared instantly at the call of the female, which had also left the box. As he climbed up to examine it the male snapped his mandibles at him from a limb overhead. On May 10 he found three white downy owlets in the nest, one not yet quite dry. He says: "The mother seemed to think I was getting too free with her household, for when I took one out she flew about, calling the male. They both came near, snapping their bills all the while. The young could not hold up their heads, their eyes were round and full, but not open. On taking them out they gave a slight peep, like

a young chicken just hatched. They grew very fast, and in eight days commenced to show signs of pinfeathers and had strength enough to snap their bills. About this time, May 18, I found one of the young with its head missing, which I could not account for unless food got short, and rather than see them all starve the birds fed one to the others. Next day the body had disappeared. I put all the remains of birds skinned on the top of the box; they made way with these and the young grew very fast. By the 25th, fifteen days after hatching, they had their eyes open. They would now back up into a corner, snapping their bills on my trying to get them out. * * * They were still in the box on June 14, when I went to the Farallon Islands, so do not know how they got on after that. * * *

"I found one the past spring that had taken up quarters in an old wood rat's nest placed 'on' a limb of a bay tree some 30 feet from the ground. A large mass of dead leaves from the tree had been put together and a hollow formed in the center, lined with feathers of fowls and birds."[1]

Mr. B. T. Gault writes me as follows: "On May 12, 1883, while riding through the timber along the Santa Anna River, near Riverside, California, a nest of this subspecies was unexpectedly discovered in an old abandoned Woodpecker's hole, presumably that of *Colaptes cafer*, in a cottonwood tree. It seemed remarkable that such a small hole would so easily accommodate a bird of this size, as we had to enlarge it to enable me to insert my hand in order to examine its contents, and I was not a little surprised in doing so to find it occupied by a family of these Owls, consisting of one of the parent birds and four young, perhaps ten days old. The mother bird appeared dazed when brought to the light, and singularly enough in taking her from the nest the entire brood was also removed at the same time, she having instinctively grasped one of the young, that one another, and so on until they all became attached, and they certainly presented a ludicrous sight as they came dangling out of the hole, each retaining a firm hold of the other, but the young finally dropped off and tumbled to the ground."

Their favorite nesting sites are old Woodpeckers' holes or natural cavities in oak and cottonwood trees, generally not over 15 feet from the ground. According to Mr. Emerson's observations, incubation lasts about twenty-three days, and I believe he is the first ornithologist who published the fact that these Owls were hatched blind. Mr. Lynds Jones confirms this fact, and has observed it in the young of *Megascops asio*.

In California nidification usually commences about the middle of April, occasionally in the latter part of March, and again, in late and cold seasons, not until the beginning of May. The eggs, numbering from three to six, generally four, and occasionally five, are deposited at intervals of one or two days. Incubation ordinarily does not begin until the set is complete.

[1] Ornithologist and Oölogist, Vol. x, 1885, No. 2, pp. 173, 174.

The eggs of the California Screech Owl are similar to those of the common eastern bird, but, notwithstanding that it is somewhat larger than the latter, their eggs average a trifle smaller.

The average measurements of twenty-six specimens in the U. S. National Museum collection is 35 by 30 millimetres, the largest egg measuring 36 by 32, the smallest 32 by 28 millimetres. As there is so little difference in the eggs of the various races of this genus, I have not figured one in every case.

## 125. Megascops asio kennicottii (Elliot).

KENNICOTT'S SCREECH OWL.

*Scops kennicottii* Elliot, Proceedings Academy Natural Sciences Phila., 1867, 69.
*Megascops asio kennicottii* Stejneger, Auk, II, April, 1885, 184.
(B —, C 318*a*, R 402*d*, C 466, U 373*d*.)

Geographical range: Northwest coast region, southern Alaska, from Sitka south probably to northern British Columbia.

Mr. William Brewster has recently rearranged the genus *Megascops*, and described three new subspecies in the Auk (Vol. VIII, No. 2, April, 1891, pp. 139–144), which I include. According to this new arrangement Kennicott's Screech Owl, an extremely dark tawny colored race, is confined to the southern coast regions of Alaska from the vicinity of Sitka, south probably to northern British Columbia.

The type, No. 59847, U. S. National Museum collection, a male, was taken by Mr. Ferdinand Bishop, at Sitka, March, 1866, and remains, so far as I am aware, unique in collections.

It is likely to be a constant resident wherever found, and there is probably no difference in its nesting habits and eggs from those of other members of this genus. It is one of the largest of the several races of Screech Owls.

## 126. Megascops asio maxwelliæ (Ridgway).

ROCKY MOUNTAIN SCREECH OWL.

*Scops asio* var. *maxwelliæ* Ridgway, Field and Forest, June, 1877, 210, 213.
*Megascops asio maxwelliæ* Stejneger, Auk, II, April, 1885, 184.
(B—, C —, R 402*c*, C 467, U 373*e*.)

Geographical range: Foothills and adjacent plains of the eastern Rocky Mountains from Colorado north to Montana.

The Rocky Mountain Screech Owl is the lightest colored and, in my opinion, the handsomest of the geographical races of Screech Owls found in the United States. Comparatively little is as yet known regarding the extent of its breeding range. As far as I am aware it has only been found along the foothills among the cottonwood timber of the creek bottoms on the eastern

slopes of the Rocky Mountains, from central Colorado, in the vicinity of Colorado Springs, where it is believed to be a winter visitor only, to the northern parts of the State, in Boulder and Larimer Counties, where it is known to breed, rarely, however, reaching a greater altitude than 6,000 feet; and also near Fort Custer, in southeastern Montana, where I first met with it in the winter of 1884–'85, and which point, I believe, still marks the northern boundary of its known range.

As Screech Owls are usually residents wherever found, rarely straggling to any great distance from their summer ranges, it is reasonable to presume that this subspecies breeds more or less commonly along the lower foothills and plains of the eastern slopes of the Rocky Mountains, as well as along the outlying spurs of the same, ranging from the eastern portions of northern Colorado through similar localities in Wyoming, north to southeastern Montana (Fort Custer), and possibly still farther in this direction. It is also likely to be found in the extreme northwestern parts of Nebraska, but it is doubtful whether it occurs on the western slopes of the Rocky Mountains. As yet it has only been found breeding in northern Colorado, where it seems to be tolerably common in suitable localities.

The following notes on the Rocky Mountain Screech Owl are taken from an article recently published by me:

"The credit of the discovery of the nest and egg of this race, the handsomest of the genus *Megascops*, belongs, I believe, to Mr. A. W. Anthony, one of our younger and most energetic naturalists, who has done excellent work in this line, as well as in other branches of natural history, in various portions of the West, and has generously donated through the writer a number of his rarest and most interesting specimens to the U. S. National Museum collection at Washington. He writes me as follows regarding this species: 'On May 4, 1883, while collecting on the Platte River, about 6 miles from Denver, Colorado, my attention was attracted by the hammering of a Red-shafted Flicker, and pushing my way through a very thick growth of willows and small cottonwoods, I found the bird at work on one of the latter, where he was excavating a nesting site. The tree was a very large one; its top had been partly broken off about 12 feet up, blown over, and some of its limbs rested on the ground. As I climbed up via the leaning top to the *Colaptes* burrow, which was located in that part of the trunk of the tree still standing upright, a Rocky Mountain Screech Owl flew out from a knot hole not before noticed and dashed almost in my face, lit on a tree within 6 feet of me, and, after staring at me in amazement for a few minutes, dropped down and out of sight in the dense undergrowth in the neighborhood. The two burrows were about 4 feet apart, nearly on a level with each other, but on opposite sides of the tree.'

"The Owl's nest was in an old knot hole about 15 inches in length, and judging from a rough sketch sent me by Mr. Anthony at the time, the base of the nest was almost on a level with the entrance. It contained three

young about a week old and an addled egg. This egg was not found until his return to the nest a second time a few hours afterward, when one of the parents was caught and a careful examination of the nest made. This, if it can be called a nest, was composed of bits of rotten wood, a few feathers of small birds, and a good many fish scales. The tree was standing within 100 yards of the river. Fish of various species seem to form no inconsiderable portion of the diet of other small Owls as well, as I have found on more than one occasion good sized brook trout (*Salmo purpuratus*) in the burrows used by Kennicott's Screech Owl (*Megascops asio kennicottii*) in Washington Territory.[1] Just how they manage to catch an active fish like a brook trout, if they take them alive, which, I must confess, is very questionable, would be interesting to know.[2]

"Mr. Anthony thinks that the Rocky Mountain Screech Owl breeds also in old abandoned nests of the Black-billed Magpie (*Pica pica hudsonica*), and he writes me that he has often found them roosting in them both in winter and spring, and has found the American Long-eared Owl (*Asio wilsonianus*) breeding in such nests.

"Mr. Denis Gale, of Gold Hill, Colorado, has taken several nests of this bird during the last three years, and finds them not at all uncommon in that vicinity. A set of four eggs now before me was found by him on April 20, 1886, on Boulder Creek, near Boulder City, Colorado. He writes me regarding these eggs as follows: 'Judging from the different stages of advancement in the embryos, I am inclined to think they were laid at intervals of from forty-eight to seventy-two hours, and that the eggs were covered continuously from the time the first one was laid. The burrow used for a nesting site by this pair of birds was an old Flicker's hole, in a cottonwood tree, about 20 feet from the ground. There was nothing between the eggs and the bare wood bottom on which they lay that bore the semblance of a nest, excepting a little wood dust and a few wing and tail feathers of the Arctic Bluebird and several species of Sparrows. These feathers were without doubt the remnants of birds fed to the sitting female by her mate, the soiled and stained eggs showing plainly their coming in contact with the mangled food devoured over them.' The female covered her eggs with great persistency and was only removed off them by force, snapping her bill and using her sharp claws with great energy when handled. Mr. Gale tells me that besides small birds, several species of the smaller rodents, frogs, and crawfish also form part of their bill of fare.

"Mr. Gale writes further as follows. 'Rarely does this species follow the creeks far into the foothills; I have not observed them at 6,000 feet altitude. Like others of their genus they seem to delight in a sheltered, shady location, close to a pond or creek where they select a domicile, either in a

[1] Recently described as *Megascops asio macfarlanei*, BREWSTER.

[2] Since this article has been written, I notice that this fishing propensity is not confined to the two races mentioned therein, but is common to the eastern form as well. (See M. A. Frazar, in Bull. Nutt. Ornith. Club, Vol. II, No. 3, July, 1877, p. 80, and Willard E. Treat, in Auk, Vol. VI, April, 1889, p. 189.)

natural tree hole or in a Flicker's old nest site. If for any reason the Flicker wishes to retain his previous year's nest site, and Scops is in possession, strife is carried on between them with great vigor, ending as often in favor of one as the other, judging from the broken eggs upon the ground ejected by the victor. The Flicker dares not enter to turn Scops out, but if the premises are vacated for ever so short a time, he enters and holds them against all comers. His formidable bill pointing out at the door is sufficient apology for leaving him in quiet possession.'

"About the middle of April is the usual period for the eggs, which are from three to five in number. The nest is usually a sparse gathering of wing and tail feathers of small birds; in some instances no litter of any kind is present. As a rule, the first two or three eggs are laid on consecutive days, with intervals of two, three, or more days between the third and last one or two, as the case may be. The female is always in charge, and at no time leaves the nest while sitting or while her brood is very young. She is waited upon and fed by the male, who, being a skillful hunter, provides liberally for her wants. Searching for nests I have sometimes discovered the male hidden in a tolerably well stocked larder, in close proximity to the nest site. In one cache were portions of a Bluebird, a mouse, and a frog; in another a Junco, a Tree Sparrow, and a minnow 3½ inches long; claws and legs of crawfish were also present. In a few cases I have discovered the male sitting upon a bough close to the stem of a cottonwood tree, perfectly motionless, with eyes almost closed as if asleep, the pupil of the eye closed to the merest slit, but with ears erect, and all alive to the danger threatening his sitting mate close by; in this well selected position, his colors and markings so nearly resembling the rough corrugated bark of the tree, he seemed to have the fullest assurance of security against observation.

"The female is a close sitter. To induce her to leave her nest is a difficult matter unless she has been frequently disturbed and understands what is meant when she hears the tree grappled in climbing it. She will then fly out. Otherwise you will have to take her off her eggs. In some instances she will feign dead and lie on her back in your open palm with her eyes shut. Immediately you throw her off, however, she will right herself on wing, and gaining a bough on a neighboring tree will crouch forward, bending her eartufts back and look very spiteful and wicked. At other times when removed from her eggs she will snap her bill, moan slightly, and show fight. Both male and female indulge in the screech, which differs but little from that of their eastern cousins. Its sharp distressing notes can be heard of a still night a mile distant.

"The lately hatched young are clothed in beautiful white down. In the latter part of June, before they are well able to fly, they may be seen sitting side by side, perfectly motionless, upon a limb close by the nest site. The young and their parents seem to desert their holes and live among

the trees for the balance of the summer; but when the cold winds strip the leaves from the trees in the fall suitable tree holes are selected for their winter quarters.

"While stationed at Fort Custer, Montana, during the winter of 1884–'85, I took five of these birds, but was unable to find their nests. I discovered their presence there quite accidentally. On December 1, 1884, while out hunting Sharp-tailed Grouse in a bend of the Big Horn River, a few miles south of the post, as I was walking by a thick clump of willows I indistinctly noticed a whitish looking object dropping on the ground, apparently out of the densest portion of the thicket and on the opposite side from where I was standing at the time, and simultaneously heard several plaintive squeaks from that direction. Carefully skirting around the thicket, which was some 20 yards long and perhaps 5 yards wide, I saw the object of my search savagely engaged in killing a meadow mouse which it had just captured. I promptly shot it. It proved to be a female and excessively fat; in fact all the specimens I secured subsequently showed conclusively that they managed to secure an abundance of food in that Arctic winter climate, and that a portion of this at least seems to be obtained in the daytime. The four other specimens collected by me were all obtained in similar locations. I have no doubt that it breeds in the vicinity of Fort Custer, but I lost trace of these birds in the spring months and failed to hear their love notes at that time. It is possible that they retire a little nearer to the mountains to breed. This is, up to date, the most northerly locality recorded at which the Rocky Mountain Screech Owl has been obtained."[1]

In Colorado full sets of eggs are sometimes found by April 1, and again as late as May 25, the latter probably a second laying, the first having been destroyed. But a single brood is raised in a season. Hollow cottonwood trees furnish their favorite nesting sites, at distances from 4 to 25 feet from the ground, but according to Mr. Gale they also breed at times in natural cavities in box elders and black willows, and occasionally a pair will make use of the adandoned nest of the Black-billed Magpie, as Mr. Anthony surmised. Mr. William G. Smith, of Loveland, Colorado, has since informed me that he found a set of eggs in such a situation in the spring of 1890. He also states that remains of young cotton-tail rabbits are conspicuous near their nesting sites while rearing their broods. He has found them nesting in the timber along the creek bottoms, fully 20 miles out on the plains, away from the foothills, and they probably reach points still farther east of the mountains.

The eggs of the Rocky Mountain Screech Owl are pure white in color and moderately glossy; the shell is smooth and finely granulated. In shape they vary from oval to a broad elliptical oval, some being decidedly more elongated than any other eggs of the genus *Megascops* I have seen. The usual number of eggs to a set is four. Of ten sets taken by Mr. Gale, three contained three eggs each, six contained four, and one set five eggs. They are usually deposited at intervals of a couple of days, and incubation sometimes begins with the first egg laid.

[1] Auk, Vol. VI, 1889, No. 4, pp. 298–302.

The average measurement of nine of these eggs in the U. S. National Museum collection, all but one presented by Mr. Gale, is 36 by 29.5 millimetres, the largest egg measuring 40 by 29.5, the smallest 34 by 29.5 millimetres. Thirty-eight eggs taken by Mr. Gale average 36.5 by 30 millimetres.

The type specimen, a single egg, taken on the Platte River near Denver, Colorado, on May 4, 1884, by Mr. A. W. Anthony, No. 22450, is figured on Pl. 12, Fig. 10.

## 127. Megascops asio trichopsis (Wagler).

MEXICAN SCREECH OWL.

*Scops trichopsis* Wagler, Isis, 1832, 276.
*Megascops asio trichopsis* Ridgway, Proceedings U. S. National Museum, viii, 1885, 355.

(B —, C —, R 403, C 470, U 373*f*.)

Geographical range: Northwestern Mexico and the contiguous border of the United States, in Arizona and New Mexico (Lower California?).

The Mexican Screech Owl is a slightly smaller race of the common form, and distinguished from it by its pure ashy gray plumage, with the middle streaks black and in strong contrast; it is only found in this phase. Its range, as far as known, extends from central Arizona and New Mexico south to northwestern Mexico, and probably Lower California, where a Screech Owl is known to occur, but of which no adult birds have as yet been taken. A pair of Screech Owls obtained by Mr. Vernon Bailey near Oracle, Pinal County, Arizona, on June 11, 1889, are, according to Mr. William Brewster, intermediate between this race and the newly described *Megascops asio aikeni*, from southern Colorado.

Its habits are similar to the other members of this extensive genus, and, like them, it nests in hollow trees or sahuaras (the giant cactus) in abandoned excavations of the larger Woodpeckers, or in natural cavities, generally at no great distance from the ground.

I first met with this little Screech Owl among the shrubbery in the Rillitto Creek bottom, near Tucson, Arizona, in 1872; it appeared to be rather rare here and I saw but few. During February and March their weird, mournful notes were frequently heard shortly after sundown. On March 10, I finally obtained one, which was sitting in a bushy willow overrun with wild grape vines. It was perched on a small limb close to the main trunk and did not appear to have seen me before I noticed it sitting in a drowsy attitude, and as soon as it saw me it straightened up, sat very erect, with all its feathers pressed close to the body, making it appear nearly as long again, and it might then have been easily mistaken for a slender stump of the limb on which it was resting. I have no doubt but that it was done for the purpose of mimicry and in which it is frequently successful.

On March 26, 1872, I found one of their nests in an old Woodpecker's hole in a willow stump not more than 7 inches in diameter and about 6 feet from the ground. The cavity was slightly over 2 feet deep, and the four eggs it contained, which had been incubated for a few days, were lying on bits of rotten wood and a few dead leaves, not sufficient to call a nest. The female was at home and had to be taken out forcibly, protesting and uttering a hissing sound, and, after being turned loose, snapping her mandibles rapidly together from her perch on a small walnut tree, into which she had flown. I was in hopes she might continue to use the same site again, but was disappointed in this.

Mr. Herbert Brown, of Tucson, finds this race nesting frequently, in that vicinity at least, in the sahuara cactus (*Cereus giganteus*), which are often used as nesting sites by both the Gila Woodpecker (*Melanerpes uropygialis*), and especially by the Gilded Flicker (*Colaptes chrysoides*), being easily excavated and affording both roomy and secure homes in which to rear their families. I believe such cavities are selected in preference to any others by the Mexican Screech Owl, as well as the more numerous Elf Owls. In a recent letter received from him, he writes me: "I have found the Mexican Screech Owl nesting in holes of sahuaras within 4 feet from the ground, and from that distance up to almost the extreme top of the plant. The sahuaras along the river bottoms, and on the mesas bordering them, are their favorite nesting grounds. At the head of the pass leading through the Tucson Mountains, about 2½ miles from the Santa Cruz River, there is a large forest of immense sahuaras, some of them 60 feet high and both body and limbs bored full of Woodpeckers' holes. As nearly all were too large to climb, I cut several down, but failed to obtain a single Owl of either this subspecies or the more common Elf Owl, and at the Quijota, 90 miles southwest of Tucson, I also cut down a number of these in a similar location some distance from water, with the same result, and I have come to the conclusion that these Owls only occupy the sahuaras growing in the lowlands and not those in the higher hills or out in the deserts.

"They are pugnacious and wicked little fellows, who will use their claws, and bite as well, on the least provocation. Small birds, kangaroo rats, gophers, different species of mice, lizards, scorpions, grasshoppers, and beetles are their staple articles of diet. From the lateness of the season in which I have occasionally found them nesting, I believe that two broods are sometimes raised in a year; still I have no actual proof of this."

In the oak regions of southern Arizona they nest in the natural cavities of these trees, most of which are hollow. Mr. O. C. Poling found two of their nests in such trees, one on May 1, the other on May 5, 1890.

Nidification begins occasionally in the last half of March, continuing through April and the first week in May, according to altitude; birds breeding in the hot valleys nesting fully a month earlier than those living in the mountain regions.

The number of eggs laid is usually three or four, rarely five. They are similar in shape and color to those of the rest of this genus. Now and then a set is found which is so badly stained by the excrement of fleas inhabiting their burrows in large numbers that the eggs, judging by their color, might be taken for those of the Sparrow Hawk.

The average measurement of twenty specimens is 34 by 29.5 millimetres. The largest egg of this series measures 36 by 31, the smallest 32.5 by 27.5 millimetres.

The type specimen, No. 20569 (Pl. 12, Fig. 11), U. S. National Museum collection, selected from a set of four from the Bendire collection, was taken by the writer near Tucson, Arizona, on March 26, 1872.

## 128. Megascops asio aikeni Brewster.

AIKEN'S SCREECH OWL.

*Megascops asio aikeni* Brewster, Auk, VIII, April, 1891, 139.
(B —, C —, R —, C —, U 373*g*.)

Geographical range: Southern Colorado (south probably to central New Mexico and northeastern Arizona).

According to Mr. William Brewster, who recently described this new race, Aiken's Screech Owl is of about the same size as the California Screech Owl, and resembles *Megascops asio trichopsis* somewhat in coloration, but with the mesial streaks and stripes of dull black coarser and more conspicuous, thus giving it a darker appearance.

The type was obtained by Mr. Charles E. Aiken in El Paso County, Colorado, on May 29, 1872, and according to his observations it is not uncommon among the cottonwood timber along the creeks in El Paso and Fremont Counties, in central Colorado. It inhabits similar localities as the Rocky Mountain Screech Owl, and the latter is frequently found, in the winter at least, in the same groves with this subspecies, whose range it overlaps here.

It is questionable if Aiken's Screech Owl occurs at any points north of Douglas County, Colorado, but it probably inhabits all the more open country along the foothills of the southern Rocky Mountains south at least to central New Mexico and northeastern Arizona.

Dr. R. W. Shufeldt, U. S. Army, found a Screech Owl breeding near Fort Wingate, New Mexico, which I think is referable to this subspecies. He took three well incubated eggs on April 18, 1887, from a cavity in an oak tree 10 feet from the ground, capturing alive both parents at the same time. I have seen photographs of these specimens, and they show every indication that the originals belonged to this race. The eggs are now in the U. S. National Museum collection, and resemble those of the other members of this genus in shape and color, and average slightly larger than the eggs of the Mexican Screech Owl, measuring 36.5 by 31, 36 by 30.5, and 34.5 by 31 millimetres. A pair of

birds from Oracle, Pinal County, Arizona, seem to be intermediate between this race and the slightly smaller and lighter colored Mexican Screech Owl. The habits of Aiken's Screech Owl are similar to those of the other geographical races and the number of eggs laid to a set varies probably from three to five, and are deposited during the months of April and May, according to latitude. It is probably a constant resident wherever found.

### 129. Megascops asio macfarlanei Brewster.

MACFARLANE'S SCREECH OWL.

*Megascops asio macfarlanei* Brewster, Auk, VIII, April, 1891, 140.
(B —, C —, R —, C —, U 373*h*.)

Geographical range: Southeastern Washington to western Montana (and probably through the entire intervening region from the eastern slope of the Cascade Mountains in Washington, south to central Oregon, east through northern and central Idaho to the eastern foothills of the Bitter Root Mountains in western Montana, north into southeastern British Columbia).

According to Mr. William Brewster, this recently described race (named in honor of Mr. R. MacFarlane, of the Hudson Bay Company, to whom we are indebted for a great deal of valuable information about the nesting habits of so many of our birds), is similar to the California Screech Owl in coloration, but much larger, resembling in this respect the type of Kennicott's Screech Owl, which appears to be equally large.

MacFarlane's Screech Owl is a constant resident wherever found and its habitat as far as known seems to be restricted to the timbered bottom lands of the lower sagebrush and bunch grass covered valleys and plains of the dry interior portions of the States above mentioned. It seems to avoid the mountains, and I do not believe that it is found at much greater altitudes than 4,000 feet. Its general habits are in no way different from those of the other members of the genus *Megascops*, excepting that on account of its larger size it is compelled to nest entirely in natural cavities of trees, the excavations made by the larger Woodpeckers breeding in the same localities, like *Melanerpes torquatus* and *Colaptes cafer*, being too small to accommodate them.

I found my first nest of MacFarlane's Screech Owl in southeastern Oregon on April 16, 1877, but referred it at the time to the California race, as the female caught in the cavity corresponded with the latter in plumage, but it unquestionably belonged to the race now under consideration. This nest was found in a hollow willow stump, in a small grove of these and cottonwood trees among which I camped while on a hunt after waterfowl on Lower Silvies River, near Malheur Lake, 20 miles southwest of Camp Harney, Oregon. The hole was about 5 feet from the ground, 18 inches deep, and contained six partly incubated eggs. There was no nest, the eggs lying on some rubbish which had accumulated in the hole; the female was caught

on the nest, and beyond snapping her mandibles made no resistance; the male was not seen.

I did not hear the tremulous notes of this bird about Camp Harney nor at Fort Klamath, Oregon, and do not believe it is found in close proximity to the mountains. At Fort Walla Walla, Washington, it is not uncommon, and I there secured a number of specimens. I also found two of its nests in the year 1881, and three more in 1882. Here the mating season began early in March, and their doleful notes could be heard every evening, shortly after sundown, throughout the month. After incubation commenced the birds were silent. In 1881 a pair of MacFarlane's Screech Owls nested in a natural cavity of a good sized cottonwood tree, about 25 feet from the ground, and within 100 yards of my quarters, giving me ample opportunity to watch them. Whenever I rapped on the tree the occupant would stick its head out and look about, but did not fly away. When first examined on March 29, I found a single egg and a dead mouse in the hole. On April 7 the set was apparently complete, consisting of four eggs. These were laid on small pieces of decayed wood and a few dead leaves. The parent remained in the hole while the eggs were being removed. I was in hopes of securing another set from this pair later in the season, but they abandoned the locality. A pair of Sparrow Hawks (*Falco sparverius*), had taken possession of an old Woodpecker's hole only about 2 feet above the one occupied by the Owls, and seemed to live in harmony with them.

The earliest date on which I took a full set of their eggs was March 26, 1882. This nest was also in a hollow cottonwood, the cavity being about 2 feet in depth and 15 feet from the ground; it contained five fresh eggs and two black spotted brook trout (*Salmo purpuratus*), as well as the parent. The latest date on which I took eggs was April 30, 1882. This nest was found on April 24, when it contained three eggs, which were left, and on reëxamination a week later, the nest was abandoned and no other eggs had been added.

All the nests found near Walla Walla, Washington, were placed in natural cavities in cottonwood trees, from 15 to 30 feet from the ground, and invariably near water. In two of the holes occupied by them I found trout from 6 to 8 inches long and a small whitefish (*Coregonus williamsonii*) about 10 inches long. It still puzzles me to know just how they manage to catch such active fish, but believe that, where obtainable, these as well as frogs form no inconsiderable portion of their daily fare, while the smaller rodents and grasshoppers supply the remainder. I do not believe it catches birds to any extent, and must be considered an eminently useful species.

But a single brood seems to be raised in a season. The eggs, which are deposited in the latter part of March or in the first two weeks in April, vary from three to six in number, usually four or five, and are deposited at intervals of one or two days. Incubation lasts from three to four weeks, both sexes assisting in this duty. The young when first hatched are covered with fine white down, and if they are born blind I failed to notice the fact.

The eggs like those of all Owls are pure white in color, rather glossy, and mostly oval in shape; some are nearly spherical; the shell is smooth and closely granulated. While not quite as large as the average egg of the American Long-eared Owl, their capacity, the shape being a more perfect oval as a rule, is very nearly the same, and the contrast in size between them and the eggs of all the other members of this family found with us (with the exception of Kennicott's Screech Owl, perhaps) is especially noticeable when placed side by side.

The average measurement of twenty-seven speimens in the U. S. National Museum collection is 37.5 by 32 millimetres, the largest egg measuring 39 by 33.5, the smallest 35 by 31.5 millimetres.

The type specimen, No. 20563, selected from a set of five eggs (Bendire collection), was taken by the writer on April 12, 1881, near Fort Walla Walla, Washington. It is figured on Pl. 12, Fig. 9.

## 130. Megascops asio saturatus, Brewster.

PUGET SOUND SCREECH OWL.

*Megascops asio saturatus* Brewster, Auk, viii, April, 1891, 141.
(B —, C —, R —, C —, U 373*i*.)

Geographical range: Shores and islands of Puget Sound, Washington, and southward along or near the coast to central Oregon, west of the Cascade Mountains; north to Vancouver Island and southern British Columbia.

According to Mr. William Brewster, this newly described race, which he names the "Puget Sound Screech Owl," is somewhat smaller than Kennicott's Owl, with the general coloring darker and less tawny, and the face and under parts much more white. It is found in two phases of plumage, gray and ferruginous.

The habits of the Puget Sound Screech Owl appear to be very much like those of the California and MacFarlane's Screech Owls. Like these it inhabits the timbered bottom lands in close proximity to water courses, nesting in natural cavities in trees, generally in oaks and cottonwoods, and raising usually a single brood in a season. In Marion County, northwestern Oregon, nidification commences usually in the latter part of April and is frequently protracted into May

Mr. C. L. Keller informs me that the number of eggs laid by this race is usually four, occasionally five, and should the first set be taken a second and smaller one is now and then laid again in the same nest.

The sites found occupied by these Owls varied from 20 to 30 feet in height, and the eggs were laid on very little nesting material, simply a few leaves and feathers. Occasionally he found some of these birds in the fir timber on the outskirts of the forests, but more often among the cottonwoods

and oaks close to water. They are constant residents in the Willamette Valley, Oregon. Its food is similar to that of the other members of this genus, and, like them, seems to be fond of fish.

Mr. A. W. Anthony writes me as follows, and his remarks evidently apply to this race: "While living at Beaverton, Washington County, Oregon, I caught a Screech Owl in a steel trap set for beaver in a ditch about 2 feet wide and 6 feet deep. The trap was not baited but placed fully 4 inches under water, and the Owl managed to get both feet well into the jaws of the trap. The bird was evidently after fish, as I have frequently seen trout in this ditch."

The eggs are similar in shape to those of the other members of this genus. A set of three eggs of this subspecies, taken by Mr. C. L. Keller, in Marion County, Oregon, on May 8, 1891, from a cavity in an old cottonwood tree, 31 feet from the ground, contained good sized embryos when found. Another, of two eggs, taken in the same locality on July 13, 1883, from a cavity 20 feet from the ground, in an oak tree, were probably a second clutch. The average measurement of these specimens, which are in the U. S. National Museum collection, is 36.4 by 30.9 millimetres.

## 131. Megascops flammeolus (Kaup).

FLAMMULATED SCREECH OWL.

*Scops flammeola* Kaup, Transactions Zoölogical Society London, iv, 1862, 226.
*Megascops flammeolus* Stejneger, Auk, ii, April, 1885, 184.
(B —, C 319, R 404, C 471, U 374.)

Geographical range: Highlands of Guatemala and Mexico, and northward to Colorado and northern California.

The little Flammulated Owl, one of the smallest of our Screech Owls, is a resident of the elevated plateaus of Guatemala and central Mexico, the southern Rocky Mountains in southwestern Colorado, the mountain regions of Arizona and New Mexico to northern California, where the late Capt. John Feilner, U. S. Army, an enthusiastic naturalist, obtained a single specimen, a young bird of the year, near Fort Crook, August 23, 1860, which was evidently raised there.

This little Owl is still one of the rarest birds in North American ornithological collections, and up to the year 1890 very little was known about its breeding habits. The single egg obtained with the female parent from a Woodpecker's excavation in an old pine tree, by Mr. Charles A. Aiken, of Colorado Springs, in Wet Mountain Valley, Colorado, June 15, 1875, and which is now in the U. S. National Museum collection, remained unique, as far as known to me, until the year 1890, when several of their nests and eggs were taken. Mr. William G. Smith, of Loveland, Colorado, well known as a good ornithologist and reliable collector, found three of their nests during that season, and has given me the following description of them: "The first nest was taken on June 2, 1890, in Estes Park, Colorado, at an altitude of probably 10,000 feet. The

site, a Woodpecker's hole in a dead aspen, was about 10 feet from the ground and the burrow about 10 inches deep. It contained three fresh eggs. The female, which was in the hole, had to be removed by force, and in doing so one of the eggs was broken; they were lying on a few chips and feathers from the bird.

"On June 4, I found a second nest about a mile from the former site and in a similar situation, a ravine near water. This contained two fresh eggs and an egg of a Flicker (*Colaptes cafer*). They were placed in a Woodpecker's hole in a large aspen, about 8 feet from the ground and 10 inches below the aperture, while about 6 feet above this was a nest of young Flickers. The cavity appeared to have been formerly used by a squirrel and the eggs were deposited on the old nesting material. It also contained a few Flicker's feathers. The female clung tenaciously to her eggs.

"On June 20, I found the third nest, but this time at a considerably less altitude, probably at about 8,000 feet. It was in a pine tree in a Woodpecker's hole about 14 feet from the ground, and contained four partly incubated eggs. On rapping on the tree the old bird flew out and perched on a limb close by while I investigated the nest. This consisted of a few feathers in the bottom of the burrow, which was about 10 inches deep. The bird's stomach contained the remnants of some small mammal. In none of these cases did I see the males, although my son and I searched around the vicinity of each nest thoroughly. I believe these birds are strictly nocturnal, and consequently rarely seen."

This set, with the female parent shot at the same time and purchased, is now in the U. S. National Museum collection. The four eggs measure, respectively, 29.5 by 25, 29 by 25.5, 28 by 25.5, and 28 by 25 millimetres.

Mr. Evan Lewis found a set of three eggs of this species on June 7, 1890, near Idaho Springs, Clear Creek County, Colorado. The nesting site was a Woodpecker's hole in a dead spruce tree about 15 feet from the ground, the eggs lying on a few feathers. Elevation about 8,700 feet. These eggs are now in the collection of Mr. Thomas H. Jackson, West Chester, Pennsylvania.

From what we know of the habits of the Flammulated Owl they seem to vary but little from the other races of the Screech Owl family. They are apparently strictly nocturnal, and their food consists of the smaller mammals, as well as beetles and other insects. The stomach of a specimen killed by Dr. C. Hart Merriam in the Grand Cañon of the Colorado, September 13, 1890, contained a scorpion, some beetles, and other insects.

Three or four eggs are laid to a set, and in the southern Rocky Mountain region in Colorado, the only locality where it has as yet been found nesting, nidification begins either late in May or the first week in June, but probably considerably earlier at less altitudes elsewhere in its range.

The eggs of the Flammulated Screech Owl are white, with a faint creamy tint, and oval in shape. The shell is strong, finely granulated, and slightly glossy. The average measurement of the five eggs in the U. S. National Museum collection is 28.6 by 25 millimetres.

The type specimen, No. 17199, figured on Pl. 12, Fig. 15, was taken by Mr. Charles A. Aiken, in Wet Mountain Valley, Fremont County, Colorado, June 15, 1875.

## 132. Megascops flammeolus idahoensis, Merriam.

DWARF SCREECH OWL.

*Megascops flammeolus idahoensis* Merriam, in North American Fauna, No. 5, 1891, p. 96.

(B —, C —, R —, C —, U 374*a*.)

Geographical range: Mountains of central Idaho.

The type of this new subspecies, an adult male, and as far as known the smallest of our Screech Owls, was obtained in the Big Wood River Mountains, near Ketchum, Alturas County, Idaho, on September 22, 1890, during a biological survey of that portion of the State, made under the direction of Dr. C. Hart Merriam, in charge of the Division of Ornithology and Mammalogy, U. S. Department of Agriculture. It was found among the straggling pine timber on the hills bordering Big Wood River.

It is a slightly smaller bird than the Flammulated Screech Owl and much lighter colored. The dark markings are much finer and the ashy gray tints very pronounced. It probably inhabits the mountain regions of the interior of northwestern North America and seems to attain a higher northern range than the Flammulated Screech Owl.

Nothing is as yet known about its breeding habits and eggs, but these are undoubtedly similar to those of the preceding subspecies.

## 133. Bubo virginianus (Gmelin).

GREAT HORNED OWL.

*Strix virginiana* Gmelin, Systema Naturæ, I, i, 1788, 287.
*Bubo virginianus* Bonaparte, Geographical and Comparative List, 1838, 6.

(B 48, C, 317, R 405, C 462, U 375.)

Geographical range: Eastern North America; south through eastern Mexico to Costa Rica.

The breeding range of the Great Horned Owl may be defined as follows: It extends over eastern North America from Florida and the Gulf coast, north into the southern portions of the Dominion of Canada to southern Labrador, and thence westward, principally south of latitude 50° to eastern Manitoba. In the United States the Great Plains form its western limit, including eastern

North and South Dakota, eastern Nebraska, eastern and central Kansas, the same parts of the Indian Territory, and the more heavily wooded districts of eastern and central Texas.

The Great Horned Owl, also known as the Cat and Hoot Owl, is the most powerful and destructive bird of this family found within the United States. Although apparently smaller than the Great Gray and Snowy Owls, it is really considerably larger in body than either and correspondingly stronger.

Excepting possibly in the extreme northern portions of its range, it is a constant resident wherever found, and, though mostly nocturnal in its habits, it sees well enough in the daytime and hunts its prey occasionally on cloudy days, especially when it has young to provide for.

Except during the mating and breeding season, it is an unsociable and solitary bird, rarely allowing another of the same species in the vicinity of its range, which is usually some heavily wooded tract near water. As is the case with most Raptores the female is considerably larger than the male, the latter being but a poor match for his spouse at any time, and I have little doubt that he occasionally falls a victim to the churlish and cannibalistic propensities of his stronger mate, which sometimes happens when pairs of these birds are kept in captivity.

It is generally conceded that the Great Horned Owl is by far the most destructive of all our Raptores, and, on the whole, commits more damage than all the other species together. In this instance, at least, actual facts fully bear out this universal supposition.

Dr. C. Hart Merriam states that one of these Owls has been known to decapitate three Turkeys and several Chickens in a single night, leaving their bodies uninjured and fit for the table.[1]

Aside from its frequent depredations in the poultry yard, where it helps itself to anything within reach, and often kills many more victims than it actually requires, such as Turkeys, Geese, Guinea Fowl, Ducks, Chickens, and Pigeons, and even entering coops after them, it is the worst and most relentless enemy our game birds, such as the Wild Turkey, the Ruffed and Pinnated Grouse, the Bob White, and Woodcock, have to contend against, and wherever these valuable birds are still fairly common they furnish a considerable portion of their daily food. Among the mammals, hares, rabbits, squirrels, skunks, opossums, muskrats, and the smaller rodents help to fill out their bill of fare, and if fish are procurable they show an equal fondness for this sort of food.

Whenever provender is plenty they often content themselves with simply eating the heads of their victims, rejecting the remainder, and thus wipe out whole families of birds in a single night; their sight is so keen that few manage to escape. They are generally able to procure an abundance of food even in the coldest weather, and it is the exception and not the rule to find one of these Owls in poor condition at any time of the year.

[1] Birds of Connecticut, 1877, p. 67.

The mating season of the Great Horned Owl begins in midwinter when the greater portion of the range it inhabits is still covered with snow and ice. Mr. Lynds Jones, of Grinnell, Iowa, informs me: "I once had the good fortune to steal unnoticed upon a pair of these birds in their love making. The ceremony had evidently been in progress sometime. When discovered the male was carefully approaching the female, which stood on a branch, and she half turned away like a timid girl. He then fondly stroked his mate with his bill, bowed solemnly, touched or rubbed her bill with his, bowed again, sidled into a new position from time to time, and continued his caresses. All these attentions were apparently bashfully received by the female. Soon thereafter the pair flew slowly away side by side. It is at this time that their hootings are frequently heard. The common call which is most often uttered, and I believe that of the male, is a far reaching "to-hoot-to-hoot-to-hooh," while the answering one of the female is shorter, and usually consists simply of an "ōō," or "to-ōō." Aside from these, they have several others, one a cat-like squeal or cry like "waah-hu," and again a series of yelps, similar to the barking of a dog.

None of these calls can be said to be pleasing to the ear at any time, and when suddenly awakened by them from a restful slumber, perhaps while camped in the silent and snow-covered woods on some hunting expedition, they sound uncanny enough to startle even an old woodsman on first hearing them. These Owls are often attracted by the camp-fires of hunting parties, and their flight is so easy and silent that the first notice one has of their presence is their pertinent querry, "who-who-cooks-for-you" from a tree top perhaps directly overhead, undoubtedly uttered as a protest against the invasion of their own favorite hunting grounds.

In the eastern parts of its range, where the ax of the lumberman has nearly succeeded in destroying all the primeval forests, and large hollow trees are now comparatively scarce, the Great Horned Owl breeds at present mostly in open nests, generally those of the larger Hawks, and occasionally that of the common Crow, while in the heavily timbered bottom lands of the Ohio, Missouri, and Mississippi Rivers, the majority of these birds still nest in natural cavities in trees.

Capt. B. F. Goss, of Pewaukee, Wisconsin, who is well qualified to speak on this subject, writes me as follows: "I think the natural breeding place of the Great Horned Owl is in hollow trees, and where suitable cavities can be found they are always selected. In the early settlement of this part of Wisconsin such breeding places were abundant, and I do not remember finding a single pair of these birds nesting in any other location, but with the rapid improvement of the country the large trees were mostly cut down, until now hardly one remains, and these birds are now compelled to resort to other places, and we find them making use of old Hawks' nests."

Prof. D. E. Lantz, of Manhattan, Kansas, informs me that of twelve nests found by him in that vicinity, three were in old Red-tailed Hawks' nests, one in an old Crow's nest, and eight in hollow trees.

Dr. William L. Ralph has kindly furnished me with the following information on this species: "In the Indian River region of Florida, the Great Horned Owl usually lives in the pine wood districts, breeding altogether in these localities, and I have never known it to nest in other situations in any part of this State that I am familiar with. At and in the vicinity of Merritt's Island, where I visited for several winters, these birds were so common that eight of their nests were found in one season while looking for those of the Bald Eagle, but, like most Florida birds, they are gradually decreasing.

"In this region these Owls always deposit their eggs in the nests of the Bald Eagle, and while I think that these are usually, if not always first deserted by the original owners, the natives say that the Owls drive the Eagles from and appropriate them for their own use. One of the reasons why I think the nests taken by the Owls are deserted ones is because nearly all those found occupied by these birds were situated rather near the ground, and these are the ones the Eagles generally abandon first. These nests are originally constructed of large sticks and limbs, lined with dead grasses, palmetto leaves, flags, and weeds—usually with swamp grasses alone —and after being taken by the Owls are always further thickly lined with scales of pine bark, a material I have never found in any quantity in the nests occupied by the Eagles. The amount of this bark in each nest seems to be about the same, which would not likely be the case had it fallen into the nests by chance, which may occasionally happen to a limited extent. In addition to this bark there are always more or less feathers from the birds in this second lining. Many birds of prey line their nests with leaves or bark from resinous trees and they do this as a preventive remedy for parasites, with which they are always more or less troubled. I have never heard or seen this bird in the vicinity of San Mateo, Florida, and while they are common in some parts of the State, they are entirely absent in other sections, although apparently equally suitable.

"These birds become very much attached to certain localities and seldom wander far from them, even in cases of extreme persecution. As a usual thing they will, should their nest be disturbed, take another in the immediate vicinity, and after a season or two return again to the first one; but in this locality I have known one of these Owls to lay a third set of eggs in the same nest from which the first two had been successively taken. In Florida this species usually commences breeding in December. I have taken eggs about one-third incubated December 17, and found nearly fresh ones January 5. These are the earliest and the latest dates of which I have any personal records, and have never found more than two eggs in a nest, and about 60 per cent. of the sets consisted of a single egg.

"The average measurement of a number of specimens taken by me in Florida is 56.4 by 47.7 millimetres. One egg measured only 50.8 by 42.9 millimetres, and I am sure that it was from a first laying, as it was one of the earliest taken. This egg was the only one in the nest, and partly incu-

bated when found. Seven weeks afterward I took another from the same nest, which was still smaller, but so nearly hatched that I did not try to preserve it. The Owl to which these eggs belonged was one of the largest I have ever seen, and believe that their small size was due to the very old age of the bird. It is almost certain that the Great Horned Owl raises but one brood in a season in Florida, where they feed almost entirely on waterfowl and the smaller mammals, such as rabbits, squirrels, gophers, mice, etc. I have never heard of their catching poultry in this region, and believe that they do not."

The Great Horned Owls are early breeders, laying their eggs throughout the greater part of their range in the beginning of February and occasionally even in the latter part of January. There seems to be but little difference in the time of oviposition between some of the more southern localities, Florida excepted, and those considerably farther north, and it also appears that climate has little influence in the matter. In some of the Western States, like Illinois, Iowa, and Missouri, full sets of their eggs are not infrequently found by February 1, while in the southern New England States it is not unusual to find them in the second and third week of that month, mostly however, about the beginning of March, and in New Brunswick, Nova Scotia, and Newfoundland they nest about the latter part of March or the beginning of April. The country is usually still covered with snow and ice when nidification begins, and their eggs are not infrequently frozen by the intense cold prevailing at the time.

In Newfoundland, as well as occasionally in other places, the Great Horned Owl, according to Mr. Henry Reeks, nests sometimes on the ground. In his notes on the "Zoölogy of Newfoundland," in speaking of this species, he says: "The only nest that came under my observation was built on the ground on a tussock of grass in the center of a pond. The same nest had been previously occupied for several years by a pair of Geese (*Bernicla canadensis*)."[1]

Mr. George E. Beyer, of New Orleans, Louisiana, also found a nest of this species, containing three young, in a hollow pine log on the ground. It is a well known fact that the Western Horned Owl resorts to somewhat similar locations to nest, in regions where suitable trees are wanting. Mr. Audubon also says that he has twice found the eggs of the Great Horned Owl in fissures of rocks, and while such nesting sites are perhaps rare with the eastern bird they are by no means uncommon with the Western Horned Owl. Col. N. S. Goss, in his "Birds of Kansas," states that on the plains or treeless portions of the State it likewise nests in fissures of rocks. These birds are poor nest builders, and if they do construct one of their own, it is through necessity and not from choice. In the Eastern States the majority use open nests, generally those of the Red-tailed and Red-shouldered Hawks, the Crows, and sometimes those of the larger Herons, while farther west hollow trees, when procurable, are still, to a considerable extent, resorted to. The trees most frequented by them for

[1] Zoölogist, 2d series, IV, 1869, p. 1614.

purposes of nidification are elms, oaks, chestnuts, ash, maples, pines, spruces, and cedars, and, in the more western parts of their range, sycamores and cottonwood trees.

The height from the ground varies considerably, some being placed not over 10, others fully 90 feet up, generally averaging from 25 to 40 feet. Among peculiar nesting sites the following deserve mention:

Judge John N. Clark, of Saybrook, Connecticut, writes me that he found a pair of these birds nesting in a quadruple fork of a large chestnut tree some 25 feet from the ground, the eggs lying on the bare wood, without any loose material around them whatever, not even a single leaf. Mr. P. W. Smith, jr., found another pair occupying an old soap box which had originally been put up for squirrels in a grove not over 100 yards from a house. The top of the box had blown off and it was nearly filled with dry leaves. In this condition the Owls had taken possession, and had evidently nested in it several years before discovered by him.

Such scanty repairs as may be needed are made to the nest sometime before nidification commences, and perhaps a little lining, consisting of strips of bark and dry grasses, and as incubation advances many of the feathers of the birds are added in the open nests, while if a hollow tree is used, nothing whatever is done, the eggs being deposited on the rubbish, which may have accumulated therein, such as bits of rotten wood, old leaves, and the feathers dropped from the incubating bird.

An unusual cold and wet spell may freeze or spoil the first eggs laid, and a second set is subsequently added, the former, in such case, are often pushed down among the loose rubbish in the nest. This accounts for some of the extra large sets that are sometimes found, which in reality are two sets, laid at different times, one addled the other fertile.

From one to five eggs have been found to a set, but as a rule two or three are all that are laid, the smaller number more frequently. In some sections, however, sets of four eggs are not unusual. Mr. J. W. Preston, of Baxter, Iowa, writes me that this number is found by him about once in three sets, and that in the early part of March, 1875, he found a set of five eggs too far advanced in incubation to disturb them, and which were all hatched later. This unusually large set was found in an open nest in the top of a medium sized black oak in heavy woods.

Capt. B. F. Goss writes me that he never found more than three eggs in a set, and that two are far more common. He says: "I found two nests with four young in each of them, both in hollow trees. In one the tree had been bent over and broken off, leaving a horizontal hole in the end. Two of the young were more than half grown and partly feathered, the remaining two very small and still in the down. There seemed to be a month's difference in their ages, but it occurred to me as being possible that the two large ones got in front and took most of the food, and the other two were dwarfed by starvation. In the second nest the young were of different sizes, the

largest nearly full feathered, the smallest still in the down. This regular difference can scarcely be accounted for by inequality of food, but seems to indicate that the eggs were laid at intervals of about two weeks."

I believe that where the Great Horned Owl nests in hollow trees the number of eggs laid by them is usually apt to be larger than where an open nest is used. The young are more secure in such a location and not so likely to fall or be crowded out.

According to the observations of several careful collectors, incubation is said to last only three weeks, but I believe that twenty-eight days comes nearer to the actual time required. Positive assertions in such matters cannot well be made, especially as it appears that the eggs are, sometimes at least, laid at considerable intervals, and in such cases incubation begins with the first one laid. Where sets do not exceed the usual number, two, incubation probably does not begin until the set is completed, and it is not likely that ordinarily a longer interval than three days occurs between the laying of the two eggs.

The Great Horned Owl will sometimes breed in confinement. Professor Lantz, of Manhattan, Kansas, writes me: "A pair kept in a large roomy cage, where they were seen and teased by many people, became very combative. In 1885 the female laid eggs as follows: One on January 14; this was frozen because she would not sit on it. January 29 the nest contained two more eggs, which were taken, and on February 25 two others. No more were laid."

They are not the kind of birds to make pets of. As a rule they are ill tempered, no matter how well treated, and will attack their keeper without any provocation, inflicting severe and sometimes dangerous wounds. One of my correspondents, who raised one of these Owls from the nest and kept it for three years, called it a "veritable feathered tiger," but they do not all deserve quite so bad a name.

I believe the female attends to the duties of incubation almost exclusively, the male providing her with food.

The Great Horned Owl is certainly a diligent, as well as a successful hunter, and an abundance of food is generally found in a nest with the young. Captain Goss found in one nest several partly devoured rabbits and more than a dozen rats, all without their heads, but otherwise untouched. A correspondent of Forest and Stream, in the number of May 4, 1882, writing from Saratoga Springs, New York, under the *nom de plume* of "Hawkeye," states that in a nest he examined, containing two young Owls, he found the following animals: "A mouse, a young muskrat, two eels, four bullheads, a Woodcock, four Ruffed Grouse, one rabbit, and eleven rats. The food taken out of the nest weighed almost 18 pounds. A curious fact connected with these captives was that the heads were eaten off, the bodies being untouched."

Where open nests are resorted to, these are not unfrequently used by two different species in the same year, the Great Horned Owls being the first ten-

ants, and as soon as their young have left it is taken possession of by one of the larger Hawks for the same purpose. Although at all other times unsocial, during the season of reproduction the Great Horned Owls are generally devoted and courageous in the defense of their young, caring for them long after leaving the nest. Collectors have been known to be vigorously attacked and even beaten off by them, and were quite willing to make a hasty retreat in order to keep out of reach of their sharp and powerful talons.

The eggs of the Great Horned Owl, usually two or three in number, are white in color, and show little or no gloss, though there are occasional exceptions; they are rounded oval in shape; the shell is thick and rather coarsely granulated, feeling rough to the touch.

The average measurement of twenty-five specimens is 56 by 46.5 millimetres. The largest of these eggs measures 58.5 by 48.5, the smallest 51 by 44.5 millimetres.

The type specimen, No. 20629 (Pl. 12, Fig. 12), from a set of two, was taken by Capt. B. F. Goss, near Pewaukee, Wisconsin, March 13, 1883.

## 134. Bubo virginianus subarcticus (Hoy).

WESTERN HORNED OWL.

*Bubo subarcticus* Hoy, Proceedings Academy Natural Sciences Phila., vi, 1852, 211.
*Bubo virginianus β subarcticus* Ridgway, Ornithology of the 40th Par., 1877, 572.
(B 48, part; C 317*a*, part; R 405*a*, part; C 463, part; U 375*a*.)

Geographical range: Western United States (except northwest coast); eastward across the Great Plains, straggling to northern Illinois, Wisconsin, and western Canada; north to Manitoba; south over the table-lands of Mexico (Lower California?).

The breeding range of the Western Horned Owl, a lighter gray and buff colored bird than the preceding subspecies, extends from the Mexican table-lands, north through southwestern Texas, New Mexico, Arizona, Colorado, western Kansas, western Nebraska, Utah, Wyoming, Montana, and western South and North Dakota, as well as beyond our border into western Manitoba, Assiniboia, and southern Alberta. On the Pacific coast it is found from (Lower? and) southern California northward through all the intervening States, on both sides of the Sierra Nevada, passing through British Columbia to Alaska, along the Lower Yukon River and shores of Bering Sea, to about latitude 65° N.

According to Mr. William Brewster, the Horned Owls found in Lower California are much smaller in size and darker colored than the Western Horned Owl, resembling the Dusky Horned Owl somewhat in coloration, and they will have to be separated as a new geographical race.

The Western Horned Owl is only found in the lower foothills and more open country throughout the range indicated, while in the higher mountain regions, it is replaced by the Dusky Horned Owl (*Bubo virginianus saturatus*).

There is no perceptible difference in the general habits of the Western Horned Owl from those of its eastern relatives. Their call notes are also similar; and, like it, it is the most destructive and insatiable of all the Raptores found in its range, feeding to a great extent on valuable game birds, especially the Columbian and Prairie Sharp-tailed Grouse, wherever these are abundant, as well as on Ducks, other waterfowl, and the smaller land birds. Among mammals, hares, prairie dogs, polecats, marmots, the different species of tree and ground squirrels, wood rats, and other rodents, contribute to its fare. In the more settled regions poultry yards also suffer, as these Owls rapidly develop a strong taste for such food.

In the choice of nesting sites the Western Horned Owl shows a wider range, however, than the preceding. While perhaps the majority of these birds resort likewise to hollow trees or old nests of the larger Hawks and of the common Crow, quite a number nest in the wind-worn holes in sandstone and other cliffs, small caves in clay and chalk bluffs, in some localities on the ground, and, I believe, even occasionally in badger holes under ground. On the grassy plains in the vicinity of the Umatilla Indian Reservation, in northeastern Oregon, I have several times seen Owls of this race sitting on the little mounds in front of badger or coyote burrows, near the mouths of which small bones and pellets of fur, were scattered about. While unable to assert positively that they do actually breed occasionally in such holes, the indications point that way, and this would not seem to be due to the absence of suitable timber, as an abundance of large trees grow along the banks of the Umatilla River not more than a mile away. When nesting in trees, large cottonwoods, sycamores, willows, pecans, pines, oaks, and firs, are generally preferred. In regions, however, where heavy timber is scarce they content themselves with nests in small mesquite and hackberry trees, frequently placed not over 10 feet from the ground. In Lower California (?) and southern Arizona they also nest occasionally in the sahuara, the giant cactus, so common in those regions. In Colorado, Wyoming, and Idaho, they are known to make use of old Black-billed Magpies' nests, laying their eggs occasionally inside, but more often on the broken down roof of these bulky structures. In the neighborhood of Nueces Bay, in southwestern Texas, they nest in holes in high banks, and in portions of California similar situations are occupied.

Mr. Charles A. Allen, of Nicasio, California, writes me as follows: "On the seacoast near Point Reyes I have found their nests on the ground. All along the coast the water rushing down from the hills during the rainy season has worn and cut channels out of the soft and friable soil to the depth of 100 or 200 feet as it approaches the shore, the sides of these gulches being frequently nearly perpendicular. The slopes of these cuts are in many parts covered with a growth of coarse grass, bullrushes, and tall ferns, and a place among these is usually selected by them for a nesting site. A shallow hole is scratched out next to the bank, and although you may be able to look down into the nests, they are frequently inaccessible. I have, while hunting sea birds, often started Owls from off their nests in such places."

Mr. W. Otto Emerson, of Haywards, California, found a nest of this Owl, containing three young birds, on a sleeper under a railroad bridge, and Lieut. Robert C. Van Vliet, U. S. Army, tells me that he frequently saw these birds flying about within the town limits of Santa Fé, New Mexico, a pair occupying the tower of the cathedral, and he thinks they nested there.

Mr. Denis Gale says: "Each pair of these birds have their particular range, and no amount of harassing or robbing them of their eggs two or three times a year, will induce them to leave a locality once chosen. The food supply, of course, is the chief consideration influencing their choice. In some cases half a mile of creek bottom defines the limit of their preserve or hunting ground, and occasionally it is larger, every square foot of which, in time, becomes familiar by careful watching night and day. No doubt every burrow and hiding place, from that of a mouse to a jack-rabbit, is known to them. * * * A choice of location once made is never abandoned, unless civilization blots out the cover or kills the birds."

The Western Horned Owl is extremely abundant in favorable localities. At Fort Custer, Montana, situated in the angle formed by the confluence of the Big and Little Horn Rivers, I obtained not less than twenty-eight of these Owls in the winter of 1884–'85, and at least a dozen others were killed which I did not receive. All were shot within a radius of 6 miles of the post, among the cottonwood timber on these streams. Every specimen, old or young, was excessively fat, showing that notwithstanding their numbers, they all readily procured an abundance of food even in the severest winter weather. The Columbian Sharp-tailed Grouse appeared to have suffered greatly from their depredations, as fully one-half of the birds secured contained remains of these in their crops. A few of the specimens obtained here were intermediate in plumage between this race and the Arctic Horned Owl, probably migrants from the north.

In the southern parts of their range nidification begins occasionally in the first part of January. Capt. B. F. Goss found a set of their eggs on the 8th of that month. Usually it does not begin much before February 15, and lasts until the middle of March. Climate seems to have little to do with the time of nesting with these birds, as they nest sometimes fully as late in the semi-tropical regions as they do much farther north.

The Western Horned Owl is a persistent layer. Mr. Gale writes me that he has taken three sets of eggs from the same pair of birds in the season of 1889 at intervals of about four weeks. The first set contained four eggs, the second three, and the last two each, and the nesting site was changed each time. Where they use open nests the site is likely to be changed each season, but when a hollow tree or a hole in a cliff is chosen they usually occupy the same from year to year, unless too often disturbed. The old birds can generally be found in the vicinity of their breeding ground throughout the year. Mr. Gale believes that these Owls do not breed until the second year, and as a rule only a single brood is raised; but the fact that young

birds not yet able to fly are occasionally found so late in the season, and sometimes in localities where they certainly had not been disturbed previously, it would appear as if a second might now and then be reared. A few days after my arrival at Fort Klamath, Oregon (June 18, 1882), one of my men brought me a young Owl of this subspecies which he had caught alive in the pine forest south of the post. It could barely fly at the time, and if not from a second brood the eggs must have been laid several weeks later than usual.

The eggs number two or three to a set, occasionally four, and sets of three are about as often found as the smaller number, while those of four are not especially rare. Mr. Charles F. Morrison reports taking one of six in Wyoming, an extremely large set, and Mr. Charles C. Neale writes me that he took a set of five eggs from a nest in an oak tree in the mountains in Plumas County, California.

They are deposited generally at intervals of two or three days, the female attending to the duty of incubation exclusively, I believe, and which lasts about four weeks. The male supplies his mate with the necessary food while she is so engaged, and when not hunting is usually found in close proximity to the nest. The eggs are similar to those of the Great Horned Owl.

The average measurement of fifteen specimens in the U. S. National Museum collection is 55.5 by 47 millimetres. The largest egg of this series measures 58.5 by 48.5, the smallest 53.5 by 45 millimetres. None are figured.

## 135. Bubo virginianus arcticus (Swainson).

ARCTIC HORNED OWL.

*Strix* (*Bubo*) *arctica* Swainson, Fauna Boreali Americana, II, 1831, 86, Pl. 30.
*Bubo virginianus* var. *arcticus* Cassin, Illustrated Birds of California, etc., 1854, 178.
(B 48, part; C 317*a*, part; R 405*b*, C 463, part; U 375*b*.)

Geographical range: Arctic America, chiefly the interior; south in winter to the Great Plains (the two Dakotas, Montana, etc.).

The breeding range of the Arctic Horned Owl, a much lighter colored race than the two preceding forms, is confined, as far as known at present, to those parts of the interior of British North America situated between James Bay (Moose Factory), the west shores of Hudson Bay, and the eastern slopes of the Rocky Mountains, north of latitude 51°, and extending in a northwesterly direction to northern Alaska, where a specimen was obtained by Mr. C. L. Mackay on the Attoknagik River, August 24, 1881. Like the Western Horned Owl it inhabits the more open country throughout its range, more especially along the shores of the numerous lakes and streams found in those inhospitable regions. In winter it migrates southward, though rarely entering our borders. As yet I have not seen a specimen of this race obtained within the limits of the United States that could be called typical. While stationed at

Fort Custer, Montana, I received several Owls which approached this form, being intermediate between it and the Western Horned Owl, but none were perfect types of either.

Mr. R. MacFarlane met with the Arctic Horned Owl in the country between Fort Good Hope on the Lower Mackenzie and the Anderson River region, within the Arctic circle, and in a collection of birds and eggs recently received from him is a very light colored female of this race, a perfectly typical specimen from Moose Lake, eastern Saskatchewan, shot in May, 1890, which probably marks nearly the southern limit of its breeding range. These birds feed on the numerous waterfowl, Ptarmigan, and the Arctic hares inhabiting these regions, and are probably common enough in suitable localities, where an abundance of food is easily obtainable.

Nothing is as yet known about their mode of nesting or their eggs, which are not likely to differ from those of the preceding races.

### 136. Bubo virginianus saturatus Ridgway.

DUSKY HORNED OWL.

*Bubo virginianus saturatus* Ridgway, Ornithology of the 40th Par., 1877, 572, footnote.

(B 48, part; C 317*b*, R 405*c*, C 464, U 375*c*.)

Geographical range: From Labrador and Hudson Bay; west through the interior to Alaska, and south probably through all the higher regions of the Rocky and Sierra Nevada Mountains; south to Arizona (San Francisco Mountain).

The range of the Dusky Horned Owl, the darkest colored of the different races of the genus *Bubo*, has until recently been supposed to be confined to the coast regions of Oregon, Washington, British Columbia, and Alaska Territory. As it is well known to occur also in Labrador—and, furthermore, to breed there, showing that it is not an accidental straggler—it probably also inhabits the wooded regions of the interior, covered with hardy spruce and pine forests, which connect these widely separated points, and reach from the North Atlantic Ocean nearly to Bering and the Arctic Sea. As yet, however, no specimens of this race have been obtained from the interior of British North America. This is not surprising when we consider the fact that this large bird has until very recently been overlooked in regions far more accessible than the so-called "fur countries."

During a biological survey, conducted under the direction of Dr. C. Hart Merriam, Chief of the Division of Ornithology and Mammalogy, U. S. Department of Agriculture, made in August and September, 1889, and which resulted in some extremely interesting discoveries, a specimen of this dark colored race was shot on September 14, in the pine belt on San Francisco Mountain, central Arizona. Another was seen at the same time, and they are reported as tolerably common in that vicinity. This extends the range of this race south to latitude 35° N.

Since it occurs in Arizona it will doubtless be found to inhabit all the higher timbered ranges and spurs of both the Rocky and Sierra Nevada Mountains, within the United States, and possibly the Sierra Madre of northern Mexico as well, and breeding perhaps entirely in the fir and spruce belt above an altitude of 8,000 feet, where they find a summer climate similar to that of the higher latitudes they inhabit in the Arctic regions. On the approach of winter they probably all leave the mountain summits and descend to the foothills.

I am well aware of the fact that the Dusky Horned Owl is a migrant, at least in some parts of its range, having shot quite a number of these birds in different parts of Oregon and Washington during the winter months. At Fort Walla Walla, Washington, situated in the fertile valley bearing the same name, near the northern slopes of the Blue Mountains, I found this race especially common at that season. Of the eighteen birds obtained there, twelve were referable to this form; three were intermediate, and three were typical *Bubo virginianus subarcticus*, the latter breeding there regularly, while the Dusky Horned Owls seem to retire to the higher timbered mountains at the approach of spring; at any rate, none of the dark birds were seen during the nesting season.

The late Mr. Robert Kennicott found a nest and two eggs of the Dusky Horned Owl near Fort Yukon, Alaska, April 16, 1862. The female parent (No. 27075, U. S. National Museum collection), procured at the same time, is one of the darkest colored specimens of the entire series of skins of this race in the collection. The nest is described as a large structure, made of dry branches, and placed in the top of a spruce standing in a dense grove of trees of the same species; the inner cavity was shallow and simply lined with a few feathers. It contained two fresh eggs, and another, fully formed but broken, was found in the oviduct of the female, also a smaller ovum about the size of a musket ball.

Mr. H. Connelly found the Dusky Horned Owl breeding at Fort Niscopec, Labrador, in the spring of 1863. A single egg and the female parent (No. 34958) are now in the National Museum collection. This specimen is the darkest colored bird of the entire series.

Mr. L. M. Turner, of the U. S. Signal Service, procured several specimens of this Owl while stationed at Fort Chimo, Ungava. In his manuscript on the "Birds of Labrador and Ungava," he says: "From intelligent and trustworthy sources I have learned that this species of Owl is quite common near the head of Hamilton Inlet and the southern portion of Labrador. The character of that region would indicate a greater abundance of birds of prey than in the sparsely wooded district of Ungava. That the bird is resident and breeds in Ungava is attested by specimens of both young and old."

The Dusky Horned Owl is evidently only a resident of the heavier timbered portions of British North America, the pine and spruce forests of these regions, and the higher mountain ranges of the more temperate zone.

Its general habits and food are similar to those of the preceding races. In the northern parts of its range nidification, as far as known, begins about the middle of April, and from two to four eggs are probably laid, and these are indistinguishable from those of the other Horned Owls.

Of the three specimens previously mentioned, the two taken by Mr. R. Kennicott., near Fort Yukon, Alaska, April 16, 1862, measure 55 by 47.5 and 52.5 by 48 millimetres, and the other, from Fort Niscopec, Labrador, taken by Mr. H. Connelly, measures 57.5 by 48.5 millimetres. None are figured.

## 137. Nyctea nyctea (Linnæus.)

SNOWY OWL.

*Strix nyctea* Linnæus, Systema Naturæ, ed. 10, I, 1758, 93.
*Nyctea nyctea* Lichtenstein, Nomenclator Museo Berolinensis, 1854, 7.
(B 61, C 325, R 406, C 479, U 376.)

Geographical range: Extreme northern portions of northern hemisphere in summer; migrating southward in winter in North America, almost across the United States, and even reaching, accidentally, the Bermudas.

The breeding range of the Snowy Owl in North America extends from about latitude 53° in Labrador north to the Arctic Sea, and it has been observed at the highest latitudes our Arctic explorers have as yet been able to reach. It is likewise common in Greenland during the breeding season, but much more so in the northern than the southern portions. Both Downes and Reeks report it abundant in Newfoundland during the greater part of the year, but I cannot find any positive records that it has actually been found breeding on this island, though it may do so in limited numbers in the less often visited parts of the interior. It is very doubtful if it nests at any time south of latitude 53° N., although it has been reported as nesting occasionally in Nova Scotia, New Brunswick, and northern Maine. Mr. Le Grand T. Meyer records it as breeding in Manitoba, the exact locality not stated, where he says he found a nest containing six more or less incubated eggs, February 26, 1879. He states: "I learned that a pair had used the same nest for two years. * * * The nest, aggregated by the several additions, was about 18 inches above the level of the prairie, composed of hay, grass, and sticks, warmly lined with feathers from their breasts."[1]

Gen. A. W. Greely, Chief Signal Officer, U. S. Army, mentions a nest of this species taken near Fort Conger, Grinnell Land, May 25, 1882, and young birds on July 8. He says: "The Snowy Owls bred abundantly in the vicinity of Fort Conger, and as many as fifteen or twenty-five young birds were raised in 1882, and kept by us until approaching winter compelled us to release them. A nest near Fort Conger resembled that described by Major Feilden, which was a mere hollow scooped out of the earth and

[1] Oölogists Exchange, Vol. I, No. 4. I give this record, but have not been able to verify it.—C. B.

situated on the summit of an eminence which rose from the center of the valley." In this case a few feathers and a little grass were present. The nest found by Major Feilden in Grinnell Land was obtained June 20, 1876, in latitude 82° 40′, probably the most northerly point this species has been found nesting."[1]

On the Pacific coast it is a resident, and breeds throughout northern Alaska, both in the interior and near the seacoast, and has there been met with by Dall, Turner, Nelson, Murdoch, and others.

Mr. R. MacFarlane states that the Snowy Owl is not numerous in the Anderson River country, and though every effort was made to secure its eggs and nest, the search was unsuccessful. He says: "On one occasion we noticed a White Owl hunting marmots (*Arctomys empetra*), in the barren grounds; and there can be no doubt that this and other Owls sometimes rob Ptarmigan and Ducks of their eggs."

While a few Snowy Owls remain throughout the year, braving the severe Arctic winters, even in high latitudes, by far the greater number of these birds perform annually extended migrations southward. Some winters they appear in considerable numbers in the northern parts of the United States, and a few even straggle into the Southern States. On the Pacific coast they do not come nearly as far south, and are rarely seen in the more open portions of Washington and Oregon, and I believe my records are the first from those regions. I observed it on three occasions in the vicinity of Camp Harney, Oregon, in January, 1875, and December, 1876, and at Fort Walla Walla, Washington, one each on December 1, 1880, and November 10, 1881. I did not succeed in getting any of these birds at Harney, as they were excessively shy and wide awake, but the two last mentioned were secured. One of these is now in the collection of Mr. William Brewster, Cambridge, Massachusetts.

The home of the Snowy Owl is on the immense moss and lichen covered tundras of the boreal regions, where it leads an easy existence and finds an abundant supply of food during the short Arctic summers. It hunts its prey at all hours and subsists principally on the lemming, and is said to be always abundant wherever these mammals are found in any numbers. Small rodents are also caught, as well as Ptarmigan, Ducks, and other waterfowl, and even the Arctic hare, an animal fully as heavy again as these Owls, is said to be successfully attacked and killed by them.

Mr. L. M. Turner, in his "Notes on the Birds of Labrador and Ungava," says: "This bird never seizes its prey except while the latter is in motion, except in the case probably of fish, for it is said to be an expert fisher, seeking the places overgrown with seaweed to seize any sculpin (*Cottus*) that may be lurking among the crevices of the rocks. The hares are chased and seized near the lumbar region and held by the bird, which spreads its wings and partly lifts the animal from the ground, thus depriving it of the power

[1] Lady Franklin Bay Expedition, Vol. II, 1888, pp. 26, 27.

to use its strong hinder parts. * * * The natives assert that when a Ptarmigan is sighted, the Owl endeavors to start the bird into a run and is then seized, though it adopts different tactics in this case; the prey is crushed to the ground, the outspread wings of the captor preventing those of its prey from allowing it to rise."

The nests of the Snowy Owl are ordinarily placed on the ground, usually on the highest and driest point in the surrounding tundra. Occasionally a nesting site on a rocky ledge or a cliff is chosen. In either case the nest is but a flimsy affair at best, consisting, if on the ground, of a slight hollow scratched out by the birds, and this is usually lined with a little moss and a few feathers; if on top of a ledge or a cliff, the eggs frequently lie on the bare rock, with just enough material around them to keep them in place and prevent them from rolling about. Incubation begins with the first egg laid, which are deposited at irregular intervals. Young birds are often found in the same nest with nearly fresh eggs. Mr. Turner says that the old birds, especially the female, are very fierce in the defense of their young. They fly close to the head of the intruder with their talons fully spread and snapping their mandibles. The natives in such instances seize one of the young and make it struggle, which causes a charge of the parent on the intruder, who holds up the stock of his gun and lets the bird dash against it, which usually stops further action on their part.

From three to ten eggs are laid by this species, usually from five to seven. Mr. Collett states that in 1871 he found as many as ten in several instances in northern Norway. They are deposited about the latter part of May, and in its extreme northern range not until June. All of the eggs of this species in the U. S. National Museum collection appear to have been taken in June. Some of these come from Labrador, others from Fort Churchill, Hudson Bay, latitude 59° N., a set of six from Repulse Bay, Melville Sound, Arctic America, latitude 66° N., and a set of three from the Yukon Delta, Alaska. But one brood is raised in a season.

The eggs of the Snowy Owl are white in color, with a faintly perceptible creamy tint in some instances, and oblong oval in shape. None of these eggs are as round as those of the genus *Bubo*, and their shell is roughly granulated and without luster. A few corrugated lines starting a trifle beyond the center of the egg and running to the longer axis are noticeable in the majority of specimens examined by me.

The average measurement of fifteen specimens in the U. S. National Museum collection is 57 by 45 millimetres; the largest egg of the series measuring 60 by 47, the smallest 55 by 44 millimetres.

The type specimen, No. 13041 (Pl. 12, Fig. 19), selected from a set of six eggs, was obtained by Capt. C. F. Hall, during his Arctic expedition in the *Polaris*, in June, 1867, at Repulse Bay, Melville Sound, latitude 66° N., while in search of the remains of Sir John Franklin's party.

## 138. Surnia ulula (Linnæus).

HAWK OWL.

*Strix ulula* Linnæus, Systema Naturæ, ed. 10, I, 1758, 93.
*Surnia ulula* Bonaparte, Catalogo Metodico degli Uccelli Europei, 1842, 22.
(B —, C —, R 407*a*, C 481, U 377.)

Geographical range: Northern portions of eastern hemisphere, from Norway to Kamchatka, and more northern Asiatic shores of Bering Sea (Plover Bay), accidental in western Alaska (St. Michael).

The Hawk Owl, another Old World species, likewise claims a place in our avifauna on the strength of several specimens obtained in the vicinity of St. Michael, Alaska, by the indefatigable Mr. L. M. Turner, while on duty there in connection with the U. S. Signal Service during the years 1874 to 1881.

It is slightly larger than the American Hawk Owl and readily recognized by its much lighter coloration. It seems to be a stupid bird, at times at least, as Mr. Turner caught one alive in his hands while it was sitting in a clump of rank grass. He says: "The natives assert that it is a resident, and breeds in the vicinity of St. Michael; also that it is a coast bird, *i. e.*, not going far into the interior, and that it can live a long time in winter without food, as it remains for days in the protection of the holes about the tangled roots of the willow and alder patches."[1]

Mr. Henry Seebohm, in speaking of this species, says: "It breeds throughout the pine forests of Scandinavia and North Russia, occasionally reaching as high as the birch region on the confines of the tundra. * * * The principal food of the Hawk Owl is mice and lemmings; and the bird follows the migratory parties of the last named little mammal to prey upon them. From its indomitable spirit, however, few birds of the forest are safe from its attacks. * * *

"The breeding season of the Hawk Owl apparently commences in the middle of April and lasts to the end of June. As this bird possesses the habit, in common with many of its congeners, of laying their eggs at intervals and sitting on them as soon as laid, they may be found as late as the third week in June. It makes no nest, and the eggs are usually laid in the hole of a decayed pine tree and rest on the powdered wood alone, as is the case with those of the Woodpeckers. Collett mentions a nest of this Owl in Norway, on the top of a broken pine trunk, some 6 feet below which was a Golden-eye Duck sitting on her nest. Wolley mentions a similar instance in Lapland. This Owl will also frequently take possession of the nest boxes placed by the peasants for Ducks and rear its young in them. The eggs of the Hawk Owl are from five to eight in number, white in color, smooth, and possess considerable gloss. They measure from 1.65 to 1.55 inches in length, and from 1.25 to 1.17 inches in breadth [equal to about 41.9 to 39.4 in length and 31.7 to 29.7 millimetres in breadth].

[1] Contributions to Natural History of Alaska, Turner, 1886, p. 164.

"Both birds sit upon the eggs and are sometimes found on them in company. While the female is upon her charge the male bird will perch close at hand, ready to do battle with any intruder, not even excepting man himself. Numerous instances are recorded of this bird's dauntless courage when its nest is assailed. It strikes at the intruder again and again, seeming not to care for its own safety, and but too often pays the price of its temerity with its life."[1]

Ten eggs of this species in the U. S. National Museum collection from Lapland and Finland give an average measurement of 39.5 by 31.5 millimetres. No specimen is figured, as the eggs are indistinguishable from those of the American Hawk Owl.

## 139. Surnia ulula caparoch (Müller).

AMERICAN HAWK OWL.

*Strix caparoch* Müller, Systema Naturæ Supplement, 1776, 69.
*Surnia ulula caparoch* Stejneger, Auk, I, October, 1884, 363.
(B 62, C 326, R 407, C 480, U 377*a*.)

Geographical range: Northern North America; south, in winter to northern border of the United States; British Islands.?

The breeding range of the American Hawk Owl is principally confined to the "fur country," the Hudson Bay territory, and the timbered districts of Alaska. It is said to breed in the interior of Newfoundland, and thence north and westward from latitude 48° N., through Labrador, the northeast and northwest territories of British North America to the end of the timber zone in about latitude 68° N.

According to Mr. G. A. Boardman, the American Hawk Owl is a rare resident in the vicinity of Calais, Maine. The U. S. National Museum collection contains a couple of eggs of this subspecies, obtained through Mr. Boardman, which are said to have been collected on the shores of the Gulf of St. Lawrence in the spring of 1861. This, if correct, is the most southern breeding record of this species known to me. The nest from which these eggs were taken was placed in the top of a thick fir tree. Dr. C. Hart Merriam also states:[2] "The Hawk Owl unquestionably breeds in northern Idaho. August 11, 1872, I shot one on Madison River, Montana, only a few miles from the Idaho boundary."

The American Hawk Owl is diurnal in its habits, hunting its prey to a great extent by daylight, generally early in the morning or in the evening, being often seen at such times, and on that account considered more common than other Owls inhabiting like regions, and at the same time easily obtained; its habits are fairly well known, and is sure to be noticed wherever it occurs. Its food is said to consist principally of small rodents, insects, and an occasional bird.

[1] History of British Birds, Seebohm, 1883, Vol. I, pp. 184, 185.
[2] North American Fauna, No. 5, 1891, p. 96.

According to Mr. Turner, it is a very common resident in the Yukon district, and also quite abundant near the coast. He says: "They usually seclude themselves in the willow or alder patches, and are frequently startled from some grass-covered bank of a lake; they fly equally well by night or by day. I once observed a bird of this species sitting during a bright day on a post, and approached to within a few feet of the bird; it squatted, then stood up, and seemed ready to fly at any moment; I went within 6 feet of it, and it then settled down as if to take a nap; I retired and threw a stick at it to make it fly; I shouted and made other noises, and only after several attempts to dislodge it did it fly. When taking flight from an elevated position they invariably drop to within a few feet of the earth and sail away rapidly."[1]

Mr. W. H. Dall, of the U. S. Coast Survey, found a nest of this species, containing six eggs, on the top of an old birch stub about 15 feet from the ground, near Nulato, Alaska, May 5, 1868. The eggs were lying directly on the rotten wood, and the male was sitting on them. Climbing to the nest, the bird dashed at him and knocked off his cap. These eggs are now in the U. S. National Museum collection.

Mr. R. MacFarlane says: "The Hawk Owl is not uncommon in the region of Anderson River. Four nests of this species were discovered and the eggs taken therefrom. All of these were built in pine trees at a considerable height from the ground. One was actually placed on the topmost boughs, and, like the others, constructed of small twigs and sticks, and lined with hay and moss. This nest contained two young birds, one apparently ten days and the other three weeks old, together with an addled egg. Two of the other nests contained six eggs and one seven. The parents always disapproved of our proceedings."[2]

One of these nests was found on April 28, another on May 2, and the one containing young on June 20, 1863. A single egg, taken by Mr. MacFarlane, near Fort Providence, Great Slave Lake, on April 14, 1885, shows that the American Hawk Owl breeds very early, even in high latitudes, and that some winter there also.

According to Mr. B. R. Ross, it nests occasionally in cliffs, but its usual nesting sites are probably natural cavities in trees, where they are obtainable, but when such are wanting open nests placed on the decayed tops of stumps or among the limbs of thick and bushy conifers are used.

Mr. Turner found the American Hawk Owl to be rare in southern Labrador. In his "Notes on the Birds of Labrador and Ungava," he says: "In the latter part of June, 1884, an Indian brought me two young of this species just emerging from the downy stage and not yet able to fly. As I desired to make a study of these young birds I kept them for several days and fed them on the carcasses of birds, mice, and young Ptarmigan. The quantity of food which these small Owls could dispose of was astonishing. They

[1] Contributions to the Natural History of Alaska, 1886, Vol. II, p. 16.

[2] From R. MacFarlane's Manuscript Notes on Land and Water Birds Nesting in British America.

were very nice pets, and in the course of a few days came to recognize me whenever I came to them, and always greeted me with a whistling note of plaintive tone."

The eggs of the American Hawk Owl are from three to seven in number, and nidification commences frequently long before the disappearance of the ice and snow. Like the Hawk Owl of the Old World, it lays at irregular intervals and commences to incubate as soon as the first egg is deposited, both sexes taking part in these duties. Eggs may be looked for from the latter part of April through the month of May; these vary from oval to oblong oval in shape, are pure white in color, and somewhat glossy; the shell is smooth and fine grained. They resemble the eggs of the Short-eared Owl very closely and are scarcely distinguishable from them.

The average measurement of thirty-eight specimens in the U. S. National Museum collection is 39.5 by 31.5 millimetres, the largest egg measuring 43 by 32, the smallest 36.5 by 30 millimetres.

The type specimen, No. 14564 (Pl. 12, Fig. 18), selected from a set of six eggs, was taken by Mr. William H. Dall, U. S. Coast Survey, near Nulato, Alaska, May 5, 1868.

## 140. Speotyto cunicularia hypogæa (Bonaparte).

BURROWING OWL.

*Strix hypogæa* Bonaparte, American Ornithology, I, 1825, 72.
*Spheotyto cunicularia* var. *hypogæa* Ridgway, in Coues's Key to North American Birds, 1872, 208.

(B 58, 59, C 332, R 408, C 487, U 378.)

Geographical range: Western North America; north to and beyond the northern boundary of the United States; east throughout the Great Plains; south to Guatemala; accidental in New York (city) and Massachusetts.

The breeding range of the little Burrowing Owl includes the prairie regions west of the Mississippi and Missouri Rivers, the Great Plains of the United States from northern Texas north, through the Indian Territory, Kansas, Nebraska, North and South Dakota, to about latitude 48° N. It also occurs in small numbers in western Minnesota (Swift County). As far as I am aware, it has not as yet been noticed in the southern parts of the provinces of Manitoba and Assiniboia, in the Dominion of Canada, but probably occurs there also in favorable localities. Thence it is found westward throughout the intervening States and Territories, the timbered and mountainous regions excepted, to the Pacific coast, where it reaches the southern border of British Columbia in about latitude 50°. Prof. J. Macoun found it very abundant at Kamloops, British Columbia, in 1889, and took a specimen at Revels Lake in 1890.

It is common in various localities in Idaho, Washington, and Oregon, east of the Cascade range of mountains, and it is well known to occur in consid-

erable numbers in California, especially the southern portion of the State, while in Arizona and Lower California it is somewhat rarer. It passes south, thence into Mexico and Central America.

A good deal of nonsense has found its way into print about the life history of this Owl, and the sentimental story of its living in perfect harmony with prairie dogs and rattlesnakes, both of which inhabit a considerable portion of the range occupied by these Owls, was for years accepted as quite true and furnished the ground work for many an interesting tale. Dr. Elliott Coues was perhaps the first naturalist who showed the fallacy of this generally accepted fact in an interesting article on this species in his "Birds of the Northwest." From an extended acquaintance with the habits of the Burrowing Owl, lasting through a number of years' service in the West, I can most positively assert, from personal experience and investigation, that there is no foundation based on actual facts for these stories, and that no such happy families exist in reality. I am fully convinced that the Burrowing Owl, small as it is, is more than a match for the average prairie dog, and the rattlesnake as well; it is by no means the peaceful and spiritless bird that it is generally believed to be, and it subsists to some extent at least on the young dogs, if not also on the old ones.

In California, Oregon, Washington, and Idaho, where I believe the true prairie dog is not found, they occupy the burrows of the numerous spermophiles (such as Douglas's, Townsend's, and Beechey's) infesting these States, and which are the greatest pests the farmers have to contend against in these regions. The birds enlarge these burrows to suit their needs and live on both the old and young squirrels. Wherever they abound a colony of these Owls is sure to be found also, but I doubt if they ever dig burrows themselves. At Fort Custer, in southeastern Montana, where prairie dogs are common, the young dogs furnish a considerable portion of their fare, as it was found from examination of the stomachs of two specimens that both had been feeding on such; and, judging from the ease with which they dispatch an adult ground squirrel, I have no doubt that a prairie dog would stand but little chance to hold its own against one of these Owls. Their food is quite varied, and consists principally of rodents, such as young prairie dogs, the different species of ground squirrels already mentioned, chipmunks, pocket gophers, mice, as well as shrews, small hares (cotton tails), frogs, fish, lizards, snakes, and insects of different kinds, such as grasshoppers, the large and exceedingly destructive black crickets (*Anabus simplex*) of the Great Basin, beetles, and scorpions. Birds are also said to be caught by them, and such may sometimes be the case, although I have never found any of their remains in their burrows, and I have examined quite a number.

East of the Rocky Mountains this little Owl is said to be a constant resident, even in some of the more northern portions of its range, in South Dakota, for instance,[1] and while this may possibly be true in these regions, I do not

[1] Report on Bird Migration, Cooke, Bulletin No. 2, U. S. Department of Agriculture, 1888, p. 124.

believe the same conditions hold good west of these mountains, where the winter climate is much milder in corresponding latitudes. In Washington, Idaho, and Oregon, they appear to migrate about the beginning of November and sometimes earlier, returning to their summer homes in the early part of March. At any rate, without actually examining any of their burrows during the winter months, to ascertain their presence, I never saw one of these birds, as far as I can remember, sitting in front of these at such times, and I have lived where they were very common and would certainly have noticed one occasionally if actually about. The belief that these Owls migrate regularly seems to be confirmed by the observations made by Dr. James C. Merrill, U. S. Army, in the vicinity of Brownsville, Texas, who, in his "Notes on the Ornithology of Southern Texas," makes the following statement:[1] "The Burrowing Owl is rather abundant during the winter months, but I do not think that any remain to breed." The fact that Mr. George B. Sennett, who collected in the same region for several seasons, failed to detect this Owl during the breeding season tends still more to confirm that they are only winter visitors, and consequently migrants from the North. Dr. Merrill tells me that even as far south as Fort Reno, Indian Territory, he failed to notice any of these birds during the winter, although common enough at all other seasons. That they hybernate, as some observers suppose, I do not believe for an instant.

In the vicinity of Fort Walla Walla, Washington, and Fort Lapwai, Idaho, they usually made their appearance in the first week of March, about the same time the earliest migrants arrived, and by the middle of the month they were abundant.

These birds are diurnal in their habits, and may be seen sitting in front of their burrows at any hour of the day. Where not unduly molested they are not at all shy, and usually allow one to approach them near enough to note their curious antics. Their long slender legs give them rather a comical look, a sort of top-heavy appearance, and they are proverbially polite, being sure to bow to you as you pass by. Should you circle around them they will keep you constantly in view, and if this is kept up it sometimes seems as if they were in danger of twisting their heads off in attempting to keep you in sight. If you venture too close they will rise and fly a short distance and generally settle down near the mouth of another burrow close by, uttering at the same time a chattering sort of note, and repeat the bowing performance. Occasionally, when disturbed, they alight on a small sage bush, probably to get a better view of the surroundings.

They hunt their prey mostly in the early evening and throughout the night, more rarely during the daytime. As soon as the sun goes down they become exceedingly active, and especially so during the breeding season. At such times they are always busy hunting food, and go and come constantly, and they may often be seen hovering suspended in the air like the Sparrow Hawk,

[1] Proceedings U. S. National Museum, Vol. I, 1878, p. 151.

locating their prey or darting down noiselessly and swiftly, and grasping it with their talons without arresting their flight an instant. The actual amount of food a pair of these birds require to bring up their numerous family, generally averaging eight or nine, is something enormous. Each Owl will eat fully its own weight in twenty-four hours, if it can get it.

I have, at different times, kept some of these birds in confinement for a week or more and fed them on Townsend's ground squirrels, an animal weighing more than this Owl. These were caught alive, and absolutely uninjured, in wire traps baited with carrots, and turned loose in the room where the Owls were kept; first, to see if they could actually kill rodents of this size, and, second, to find out how much they would eat in a day. To test both, I fed a pair of these Owls four live full-grown Townsend's ground squirrels in one day, besides the carcasses of five small birds which had been skinned, and was astonished at the ease and celerity with which these rodents were killed and the small amount of resistance they made. I watched the proceedings through a small hole in the door. As soon as a squirrel was turned loose in the room with the Owls, one of them would pounce on it, and, fastening its sharp talons firmly in the back of the squirrel, spread its wings somewhat, and with a few vigorous and well-directed blows of its beak break the vertebræ of the neck, and before it was fairly dead it commenced eating the head. This was always eaten first and is the favorite part. Next morning there was but little left of squirrels or birds, and the two Owls had certainly eaten considerably more than their own weight in the twenty-four hours. It actually kept one busy to supply them with the necessary food they would consume, which gives a fair idea of how much a family of half-grown young must require. As nearly all the food used by them consists of noxious vermin, it readily appears what an immensely beneficial bird the Burrowing Owl is, considered from an economic point of view, and deserving of the fullest protection.

They appear to be mated when they make their first appearance in the early spring, and I believe remain paired through life. At this season, where they are abundant, and they are generally found in little colonies of several pairs at least, their peculiar love note can be heard on all sides about sundown; it reminds me more of the call of the European Cuckoo (*Cuculus canorus*) than anything else, a mellow sonorous and far-reaching "coo-c-o-o," the last syllables somewhat drawn out, and this concert is kept up for an hour or more. These notes are only uttered when the bird is at rest, sitting on the little hillock surrounding its burrow. While flying about, a chattering sort of note is used, and when alarmed a short shrill "tzip-tzip." When wounded and enraged it utters a shrill scream and snaps its mandibles rapidly together, making a sort of rattling noise, throws itself on its back, ruffles its feathers, and strikes out vigorously with its talons, and with which it can inflict quite a severe wound.

Preparations for nidification begin in the latter part of March and continue well into April. When not disturbed, the same burrow is used from

year to year; in such a case it is cleaned out and repaired, if necessary. In different localities their choice in the selection of nesting sites varies somewhat. At Fort Lapwai, Idaho, they generally selected a burrow on a hillside with a southerly exposure, while at Walla Walla their nests were always found in burrows on level ground. At Camp Harney, Oregon, where the Burrowing Owls were not very common, one under a large basaltic bowlder seemed to be a favorite site with them, and here they encroached upon the timber in the foothills of the Blue Mountains. At Fort Custer, Montana, I found them mostly on level ground, generally bottom lands, and always at the outskirts of a prairie dog village. On the Pacific coast the burrows of the ground squirrels are more often used for nesting sites, and occasionally those of badgers, which are quite common in some sections. If one of the former is selected, it has first to be considerably enlarged, and which requires a good deal of patient labor on the part of the Owls to accomplish. While stationed at Fort Lapwai I had an opportunity to see an Owl at work enlarging and cleaning out a burrow. The loosened dirt was thrown out backward with vigorous kicks of the feet, the bird backing gradually toward the entrance and moving the dirt outward in this manner as it advanced. These burrows vary greatly in length and depth, and are rarely less than 5 feet in length and frequently 10 feet and over. If on level ground they usually enter diagonally downward for 2 or 3 feet, sometimes nearly perpendicularly for that distance, when the burrow turns abruptly, the nesting chamber being always placed above the lowest part of the burrow. If in a hillside it will frequently run straight in for a few feet, and then make a sharp turn direct to the nesting chamber. At other times the burrow follows the curves of a horseshoe, and I have more than once found the eggs in such a burrow lying within 2 feet of the entrance and close to the surface of the hill on a trifle higher level; where, had it been known they could have been reached with little trouble. These burrows are generally about 5 inches in diameter, and the nesting chamber is usually from 1 foot to 18 inches wide. After the burrow is suitably enlarged, especially at the end, dry horse and cow dung is brought to the entrance of it, where it is broken up in small pieces, carried in and spread out in the nesting chamber which is usually lined with this material to a thickness of 1 or 2 inches, and I have never found any other material in the nest. In California, however, they are said to line them occasionally with dry grasses, weed stalks, feathers, and similar materials. On one thing most observers agree, namely, that their burrows invariably swarm with fleas.

In southern California the Burrowing Owl commences laying about the beginning of April; in Oregon, Washington, and Idaho, rarely before the 15th of the month, and usually about the latter part of it; in Kansas and northern Texas it begins about the same time; in Utah, fresh eggs have been found as late as June 15, and at Fort Collins, Colorado, on July 1.

Although incubation does not appear to begin until the clutch is nearly completed, I always found one of the parents at home, even if there was but a single egg in the nest. The old bird is courageous in the defense of its

domicile, and as a rule will not leave it, although the way may be left clear for it to do so. Backing up to the extreme end of its burrow, it will strike with beak and claws in defense of its nest. Frequently when within a foot or two of the nest proper, and before it was yet visible the occupant made a rattling noise, produced by the rapid movement of its mandibles, which sounded very much like the warning of the rattlesnake when disturbed; this would easily impose on the average investigator, and proceeding out of the burrow, somewhat muffled and subdued, is very similar indeed to the rattle of the latter.

The number of eggs laid by the Burrowing Owl varies from six to eleven. From seven to nine are more often found, while sets of ten and eleven are not especially rare, and Mr. Walter E. Bryant, of Oakland, California, found one of twelve near Carson, Nevada. The eggs are usually found in a single layer and disposed in the form of a horseshoe. On two occasions in extra large sets, I found them placed on top of each other. It is astonishing how they manage to cover them all, but they do, and it is rare to find an addled egg. Both parents assist in incubation, which lasts about three weeks, and but a single brood is raised in a season. A second, and somewhat smaller set is frequently laid in the same burrow or in another close by, if the first eggs are taken.

The eggs of the Burrowing Owl, after they are washed, are pure white in color, but as taken from the burrow they are usually much soiled by the excrement of the numerous fleas inhabiting these domiciles, and bear then no resemblance to white. They are much more glossy than most Owls' eggs and are usually rounded ovate in shape. The shell is close grained and rather smooth, but in some sets it is strongly granulated.

The average size of a fine series of these eggs is 31 by 25.5 millimetres, the largest egg of the series measuring 34 by 27 millimetres, the smallest 28 by 25 millimetres.

The type specimen, No. 20578 (Pl. 12, Fig. 14), from the Bendire collection, selected from a set of nine eggs, was taken near Fort Walla Walla, Washington, April 21, 1881.

### 141. Speotyto cunicularia floridana Ridgway.

FLORIDA BURROWING OWL.

*Speotyto cunicularia* var. *floridana* Ridgway, American Sportsman, v, July 4, 1874, 216.

(B —, C —, R 408*a*, C 488, U 378*a*.)

Geographical range: Florida and the adjacent Bahama Islands (New Providence).

The breeding range of the Florida Burrowing Owl, a variety somewhat lighter colored than the preceding, seems to be confined to the State of Florida and to some of the Bahama Islands. It is an inhabitant of the vast prairie found north of Lake Okechobee and similar localities in other parts of the State.

Mr. Walter Hoxie, in an interesting article on the breeding habits of this species, says: "Although in the west the Burrowing Owl usually inhabits the deserted domicile of some animal, this does not seem to be the case with the Florida Burrowing Owl (*Speotyto cunicularia floridana*). There are no animals in the country the latter bird inhabits that make such holes as they require, and I am assured that every hole is occupied by a pair of Owls in the spring, and when one is caved in by the feet of cattle or horses, its occupants at once proceed to excavate a new one. The Indians say that they use their feet for this purpose, and dig pretty fast, too. Their imitation of the cry of the bird was very much like the notes of the Cuckoo, and not at all Owl like in its tone. * * *

"The burrows are found either in the very highest parts of the prairie or in the thickest vegetation, and occupy a peculiar sort of sandy flat ground, which, however, is covered with a good tough turf. They are about 5 inches wide and 3½ high, and extend under ground, on the average, less than 6 feet. A few found were 8 feet and over and only one less than 4 feet. The superincumbent soil is from 8 inches to 1 foot thick, and the chamber at the extremity in which the nest is placed is quite circular, and not less than 1 foot in diameter. It is higher than the passageway leading to it, and being likewise slightly domed, brings the top quite near to the surface of the ground. It is this part of the habitation which is most often caved in by the feet of passing cattle. The sand that is thrown out at the mouth of the burrow makes quite a conspicuous mound in the open prairie, but in the 'roughs,' or those places that have not been burned over for some years, the weeds and grass are rich and rank about it, doubtless fertilized by the droppings and castings of the inhabitants. This hides the burrow pretty effectually from the casual observer, but after a little experience these circular patches of richer vegetation were quite valuable as guides in my search. I found no very large towns, the usual number of burrows being five or six. The largest number found together was eleven, and the smallest three. The holes open to all points of the compass, although one of the oldest settlers in the region assured me that they always extended south under ground. They seldom make much of a turn. When one hole was found I always looked for others within at least a rod, and occasionally they were not more than a yard apart."[1]

Mr. J. F. Menge writes me from Myers, Florida, as follows: "The Florida Burrowing Owl nests on the high open prairies in this vicinity, beginning to lay about March 15 and up to the middle of May. The eggs range from four to eight to a set, usually six. The burrows vary greatly both in length and depth. I have found nests all the way from 6 to 16 feet from the entrance, and only 5 inches to 3 feet under ground. The nest is always placed from 2 to 4 inches above the level of the passageway in a circular chamber near the end of the burrow. The eggs are laid on a

[1] Ornithologist and Oölogist, Vol. XIV, 1889, No. 3, pp. 33, 34.

bed of dry cow dung and grass roots. The food of these Owls consists mostly of beetles, grasshoppers, small snakes, and frogs. Many of their nests are yearly destroyed by skunks and opossums, who seem to be very fond of the eggs. During the spring of 1890 I secured several full sets in the following manner. By not disturbing the entrance, simply inserting a pliable stick as far as it would go in the hole, withdrawing it and measuring, then digging a small hole down to the passageway and using the stick again as before until I came to the nest, I could examine it, and, in case the set of eggs was not complete, cut a turf to fit each hole made, taking care to shut out all light, and thus found that the birds would continue laying as if nothing had disturbed them. A few days later I went back to the nests so treated, and lifting the turf carefully, invariably found the bird at home. She always made a rattling sound like that of the rattlesnake, so much so, indeed, that the party who was with me jumped back and said, 'Lookout, there is a rattlesnake!' These birds are persistent layers. I robbed a pair three times, first of eight eggs, then of five, and the last time of four. These were all laid in the same burrow, but each set was a little deeper in. One of their burrows found by me described almost a complete circle, the nesting chamber being situated within 2 feet of the entrance hole."

After the breeding season is over, the Florida Burrowing Owl is said to disappear for a time from its usual haunts, but where it goes is not positively known. On the whole, its habits are very similar to those of the common Burrowing Owl.

Mr. Menge, from whom I obtained a set of six eggs, sent the nesting material on which they were found. In this instance it consisted entirely of the burnt ends of grass stalks and the charred roots, evidently pulled up by the birds, and mixed with this material were some few breast feathers of the Ground Dove (*Columbigallina passerina*).

The eggs are indistinguishable from those of the preceding subspecies, and their shells are equally smooth and glossy; their shape is also similar.

The average measurement of twenty-three specimens is 31.5 by 26.5 millimetres, the largest egg of the series measuring 33 by 29, the smallest 30 by 25.5 millimetres.

The type specimen, No. 18192 (Pl. 12, Fig. 16), was obtained from Dr. J. W. Velie, and taken in southern Florida in the spring of 1880.

## 142. Glaucidium gnoma Wagler.

PYGMY OWL.

*Glaucidium gnoma* Wagler, Isis, 1832, 275.
(B 60, C 329, R 409, C 484, U 379.)

Geographical range: The interior and mountainous parts of western North America, from British Columbia; south through the United States to the table-lands of Mexico, excepting the Pacific coast region; east to the eastern slopes of the Rocky Mountains.

The breeding range of the Pygmy Owl, as far as known, extends through the timbered regions of western North America, from the southern Rocky Mountains in Colorado, New Mexico, and Arizona, westward to eastern California, eastern Oregon, and eastern Washington, north into eastern British Columbia, and south into Mexico.

The following is quoted from an article written by me and published in The Auk, October, 1888 (Vol. v, pp. 366–372), with a few verbal changes:

"The general habits of the Pygmy Owl are by this time pretty well known, and there remains little for me to add to its life history that is really new. It is a well established fact that it is quite diurnal and hunts its prey, to a great extent at least, during the daytime; its food consists not alone of grasshoppers and other insects, as some of the earlier naturalists surmised, but also of birds and the smaller rodents, some of the latter considerably heavier than itself.

"I presume that it is not at all uncommon throughout the entire mountainous and timbered portions of the West; but from its small size and retiring habits, generally being hidden in dense evergreen trees, it is not often noticed by the naturalist, and usually only by accident. I have taken it personally in the Blue Mountains in Washington and in several places in Oregon, but have never met with more than one at a time. My specimens were, with but a single exception, found in or near pine timber. While hunting Sage Fowl on the morning of February 5, 1875, in the vicinity of Camp Harney, Oregon, I shot a female Pygmy Owl at least 5 miles from the nearest timber. It was perched on a large bowlder lying at the foot of a basaltic cliff, and allowed me to approach quite closely. It had just about finished breakfasting upon a Western Tree Sparrow, as indicated by the feathers scattered about and on the rocks; it was in prime condition and exceedingly fat.

"The first of these little Owls coming under my observation was shot by Sergeant Smith, who used frequently to hunt with me. On the morning of December 14, 1874, we were out hunting Sooty Grouse along the southern slopes and among the foothills of the Blue Mountains, a few miles north of Camp Harney, and had been quite successful. The sergeant was walking along the edge of a mesa, while I was about 100 yards below him hunting among some service berry bushes growing about half way up the slope of the hill, and

in which Grouse were usually found feeding at that time of the year. Hearing the sergeant fire (he could not be seen from where I was standing), I called to him and asked what he had shot. His reply seemed at the instant rather strange to me. It was, 'Captain, I shot a baby Owl riding on a rat; I have got them.' Had I not known the sergeant to be a strictly sober man, not at all addicted to drinking, I should have readily agreed with him 'that he had them,' and laid it to overindulgence in something stronger than water on that particular morning; but when I climbed up to where he was standing the matter was fully explained.

"It appears that a tall old pine tree had been uprooted years ago by some of the heavy wind storms that occasionally sweep over that region, and the roots of it were lying partly under a younger and bushy tree of the same species that was taking the place of the older one in the course of nature. The massive trunk of the old tree was free from limbs for about 40 feet, and was slowly but surely decaying. A large sized gopher, which perhaps, found a congenial home amidst the roots of the old tree, on hearing the noise the sergeant made in his approach, had climbed up on to the trunk of the tree, possibly to get a good view of the intruder and to warn the balance of his family, when, quick as a flash, a little Pygmy Owl that had been securely hidden among the branches of the growing pine, dropped down with unerring aim on its victim and fastened its sharp little talons securely into the astonished gopher's back. Sergeant Smith's attention was drawn to the performance by a squeak from the gopher, which, in trying to escape, ran along on top of the fallen pine almost its entire length, making rather slow progress, however, hampered as it was by the Owl, when the sergeant fired, killing both. During this time, nearly a couple of minutes, the Owl sat upright on the gopher's back, never letting go its hold an instant, twisting its head nearly off the body in trying to keep an eye on the sergeant, who was rapidly approaching, but apparently showing no uneasiness whatever. He told me that the whole thing was done in such a business-like manner that it was evidently not the first ride of the kind this little Owl had so taken. It held on to its prey even in death. (I published a short account of this occurrence at the time in the Proceedings of the Boston Society of Natural History (Vol. XVIII, October 6, 1875). Both specimens are in the U. S. National Museum collection.)

"I also met with the Pygmy Owl on several occasions at Fort Klamath, Oregon, and remember quite distinctly seeing one (presumably the same individual) several times at various hours of the day, sitting patiently, but wide awake, on a single long and slender willow branch overhanging Fort Creek, but a little distance from the post. I refrained from shooting it as I suspected it nested in the vicinity, and it would also have been rather difficult to secure. I cannot say positively, but think that it used that particular perch for no other purpose than to catch frogs. The willow overhung a marshy, reed-covered spot, where the water was rather shallow, and which

seemed to be a favorite resort for numbers of these batrachians. Small birds, of which there were numbers about in the vicinity in the willow thickets bordering the stream, did not seem to resent the presence of the little Owl, and paid no attention whatever to it.

"Its call notes may often be heard during the early spring months while mating, and usually shortly after sundown. Its love notes are by no means unmusical. They somewhat resemble the cooing of the Mourning Dove (*Zenaidura macroura*), like 'coohuh, coohuh,' softly uttered, and a number of times repeated. Although I have not positively seen this bird while in the act of calling its mate, am quite certain that the notes emanated from this little Owl and no other. I am familiar with the notes of the Acadian and MacFarlane's Owls (*Nyctala acadica* and *Megascops asio macfarlanei*), the only other of the small Owls at all likely to be found there, but their notes are different, and they were not heard by me while stationed at Fort Klamath, Oregon.

"Mr. Henshaw found the Pygmy Owls quite numerous in the southern Rocky Mountains, and states that they are rather sociable in disposition, especially during the fall months. He says he has imitated their call and readily lured them up close enough to be seen.[1] I am inclined to think that they are much more common there than farther north. * * *

"During an absence once from Fort Klamath on official matters, one of my men found on June 10, 1883, a burrow occupied as a nest by the true *Glaucidium gnoma*, which at the time it was first discovered must have contained eggs. The nest was not disturbed till the day after my return to the post, June 25, when he showed it to me. The nesting site used was a deserted Woodpecker's excavation, in a badly decayed but still living aspen tree and was about 20 feet from the ground; the cavity was about 8 inches deep and 3½ wide at the bottom. This tree, with two others of about the same size, stood right behind, and but a few feet from a target butt on the rifle range, which had been in daily use since May 1, target firing going on three or four hours daily. All this shooting did not seem to disturb these birds, for the first egg must have been deposited some two or three weeks after the target practice season began, but the strangest thing is that the Owls were not discovered long before, as two men employed as markers were constantly behind the butt in question during the firing and directly facing the entrance hole of the burrow. When the nest was shown me I had it examined, and, much to my disgust, found it to contain, instead of the much coveted eggs, four young birds about a week or ten days old. I took these; two of them are now in the U. S. National Museum, the remaining two in Mr. William Brewster's collection at Cambridge, Massachusetts. The cavity was well filled with feathers of various kinds, and contained besides the young, the female parent and a full grown Say's chipmunk (*Tamias lateralis*), that evidently had

[1] Auk, Vol. III, January, 1886, p. 79.

just been carried in, as it had not been touched. The cavity was almost entirely filled up by the contents mentioned."[1]

Mr. William G. Smith, of Loveland, Colorado, well known as a reliable naturalist and collector, writes me that he found a nest of this species, on May 31, 1890, containing three young birds apparently about two days old and a single egg which was on the point of hatching, in a ravine near Estes Park at an altitude of about 10,000 feet. The site was in an old Woodpecker's hole in a dead aspen about 14 feet from the ground. The nest, if it can be called such, was composed of a few feathers and rubbish. The female was in the hole, and in trying to take her out the egg was broken; the male was perched on a tree close by and was likewise secured. Mr. Smith also states in one of his letters to me that one of these little Owls made itself quite familiar in the town of Loveland, Colorado, during the winter (1890), flying about the houses during the daytime for several days, until shot. He regards them as rare in that vicinity.

Mr. Charles F. Morrison reports having taken four sets of their eggs in La Plata County, Colorado, during 1886 and 1887, but fails to describe or to give measurements of these eggs, and I have been unable to borrow any of these specimens for examination. He states that they nested in deserted Woodpeckers' holes and hollow stubs on the sides of gulches grown up with pine timber. He gives the earliest date of nesting as June 1, and the latest June 22. The nesting sites were from 8 to 20 feet up. The only note he heard them utter was a faint squeak.

The food of the Pygmy Owl consists principally of the smaller rodents and birds, some considerably larger than itself. It is a decidedly savage little fellow and a courageous one as well. In speaking of their food, my friend Dr James C. Merrill, U. S. Army, makes the following statement: "One captured February 21, had just struck at a Robin, and was struggling with it on the ground. It is said to be especially abundant in summer at Modoc Point, Klamath Lake, Oregon, and to feed upon a lizard that is common there. I have also found fragments of field mice in their stomachs. Insects, however, and especially grasshoppers, constitute the greater part of their food, when they can be obtained. When the Owl is searching for these, the smaller birds pay but little attention to it, even if it happens to alight near them."[2]

Judging from the date of nesting but a single brood is raised in a season, and incubation appears to begin with the first egg laid. They are constant residents wherever found.

I regret that I am unable to give a detailed description and measurement of their eggs, which appear to be usually four in number, but they will unquestionably prove indistinguishable from those of its near relative, the California Pygmy Owl, which are known.

[1] Auk, Vol. v, No. 4, October, 1888, pp. 366–371.
[2] Auk, Vol. v, No. 2, April, 1888, p. 146.

## 143 Glaucidium gnoma californicum (Sclater).

CALIFORNIA PYGMY OWL.

*Glaucidium californicum* Sclater, Proceedings Zoölogical Society London, 1857, p. 4.
*Glaucidium gnoma californicum* Bendire, Auk, Vol. v, October, 1888, p. 366.
(B 60, part; C 329, part; R 409, part; C 484, part; U 379*a*.)

Geographical range: Coast region of California, Oregon, Washington, and southern British Columbia.

The California Pygmy Owl, a darker colored race than the preceding, is a resident of and breeds in the timbered regions adjacent to the Pacific coast from about latitude 37° N. in middle California, through western Oregon, Washington, and southern British Columbia, where Mr. Clark P. Streator reports it as common in the vicinity of Mount Lehman, in latitude 49° N., and breeding. In the drier climate in the interior of these States it is replaced by the true *Glaucidium gnoma*, and its habits generally are very similar to that subspecies. I believe the credit of discovery of the nest and eggs of this Owl belongs to Mr. George H. Ready, of Santa Cruz, California, who found a nest on June 8, 1868, containing three eggs, in a deserted Woodpecker's excavation in an old and isolated poplar tree growing on the banks of the San Lorenzo River, near the above mentioned locality. The cavity was 75 feet from the ground. A short account of this find was published by me in the Proceedings of the Boston Society of Natural History (Vol. xix, March 21, 1879, p. 132), and a somewhat fuller description, by W. C. Cooper, can be found in the Bulletin of the Nuttall Ornithological Club (Vol. iv, April, 1879, p. 86).

The two eggs which Mr. Cooper has made drawings of, and which I have before me, are nearly ovate in shape, and said to be dull white in color, with a scarcely perceptible yellowish tinge. Their surface is described as quite smooth, and to have the appearance of having been partly punctured with a fine needle point over the whole egg. Judging from the drawings they are decidedly pointed for Owls' eggs, and perhaps somewhat abnomal in this respect, resembling the eggs of the Burrowing Owl in shape. Their size is given as 1.18 by 0.90 and 1.17 by 0.87 inches (about 30 by 22.9 and 29.7 by 22.1 millimetres).

I recently had an opportunity to examine two sets of eggs, now in the oölogical collections of Messrs. Samuel B. Ladd and Joseph Hoopes, of West Chester, Pennsylvania, which are said to belong to this subspecies. Both were collected in Benton County, Oregon, and found in Woodpeckers' excavations in dead trees in swampy woods. One of these sets, taken May 20, 1889, containing four eggs, and now in Mr. Ladd's collection, measures, respectively, 27 by 23, 26.5 by 23, 26 by 23, and 26 by 22.5 millimetres. The shells of these eggs are smooth, close grained, and very thin, almost semitranslucent. In color they are dull milky white, with a very faint creamy tint, and show no luster, but have the peculiar pittings or punctures already referred to, and which seem to be characteristic of the eggs of this Owl. They are rounded

oval in shape, about the size of the well known egg of the little Whitney's or Elf Owl, but can be readily distinguished from these by the different texture of the shells.

Mr. Charles A. Allen, writing me about the California Pygmy Owl from Nicasio, California, says: "In this section it inhabits the heavy coniferous forests, and is rather difficult to obtain at any time. Its love note is a soft low musical 'toot-toot,' repeated at intervals of a few seconds between each call. During the mating season, which commences here about the last of February, these birds can be heard any still morning up to 8 or 9 o'clock, and if it be dull and cloudy to nearly 11 o'clock; after that hour they remain silent until sundown. I consider them good weather prognosticators, as I hear them invariably just before a storm. After the breeding season is over and during the summer months they remain silent. The male when calling usually selects one of the tallest trees and perches near the topmost branches. Their food consists of small birds and mammals, and I have found them feeding on *Pipilo oregonus* and *Habia melanocephala*, and also saw one pounce down on a *Tamias townsendi* sitting on a log, seize it and fly up into a large redwood tree, where I found it feeding three young which were sitting on a limb close beside it, and crowding one another to obtain the food as fast as the parent could tear it up into suitable pieces for them."

Prof. O. B. Johnson, in his "List of the Birds of the Willamette Valley, Oregon," referring, I think, to this bird, says: "Quite common; I have not seen the nest. They are savage little fellows and will attack cage birds in daylight, and I know of two that suffered death thereby."

As with the preceding subspecies, nidification commences in May, and occasionally not before June. The number of eggs to a set seems to be three or four, and probably but a single brood is raised in a season. As the egg of the California Pygmy Owl is indistinguishable from that of the Ferruginous Pygmy Owl, as far as size and shape are concerned, and of which a specimen is figured, I have not illustrated it.

## 144. Glaucidium gnoma hoskinsii Brewster.

HOSKIN'S PYGMY OWL.

*Glaucidium gnoma hoskinsii* Brewster, Auk, v, April, 1888, p. 136.
(B —, C —, R —, C —, U 379*b*.)

Geographical range: Lower California.

Mr. William Brewster, who first described this new subspecies, speaks of it as being "similar to *Glaucidium gnoma californicum*, but smaller and grayer, the forehead and fascial disc with more white and the upper parts less distinctly spotted."

The type specimen, an adult male, was taken in the Sierra de la Laguna, Lower California, May 10, 1887, by M. Abbott Frazar; and two others were

obtained in the same locality June 2 and 4, respectively. Mr. Walter E. Bryant took another male near Comondu, Lower California, March 22, 1889.

Nothing is as yet known about the breeding habits and eggs of this new subspecies, but there is no reason to believe that they differ in any respect from those of the two preceding geographical races.

## 145. Glaucidium phalænoides (Daudain).

FERRUGINOUS PYGMY OWL.

*Strix phalænoides* Daudain, Traité d'Ornithologie, II, 1800, 206.
*Glaucidium phalænoides* Cabanis, Journal für Ornithologie, 1869, 208.
(B —, C 330, R 410, C 485, U 380.)

Geographical range: Whole of tropical America (except West Indes); north to southwestern border of the United States (southern Texas to Arizona).

The Ferruginous Pygmy Owl is a resident of the southern border of the United States, breeding in the valley of the Lower Rio Grande in Texas, and in southern Arizona. It doubtless occurs in the intervening regions as well.

Mr. George B. Sennett found it not uncommon at Lomita, Texas, and says: "From its small size it is not readily seen in heavy timber. Its note, a clear whistle, quite difficult to follow, was often heard during April and May. A female captured April 9 contained eggs nearly ready to be laid."

I am able to add but little more relating to the life history of this Owl than what I have already published in the Auk (Vol. v, No. 4, October, 1888, pp. 371, 372), which is here appended, as follows: "This widely distributed species was first described by Prince Max z. Wied in 1820. It inhabits the whole of tropical America (the West Indies excepted), and is found to the northward along the southwestern border of the United States, occurring in southern Texas and Arizona. It was first added to our fauna by the writer, who took several in 1872 in the heavy mesquite thickets bordering Rillitto Creek, near the present site of Camp Lowell, in the vicinity of Tucson, Arizona. The first specimen was taken January 24, 1872, showing that it is a resident throughout the year; other specimens were obtained during the following spring and summer. Unfortunately, I was not then an adept in taxidermy; the skins made by me in those days looked as if they had passed through the jaws of a hungry coyote, and they were only useful in determining species. Like *Glaucidium gnoma*, this little Owl is quite diurnal in its habits. Its call, according to my own notes, is 'chu, chu, chu,' a number of times repeated, and most frequently heard in the evening. According to Mr. F. Stephens, its note is a loud 'cuck,' repeated several times as rapidly as twice each second. He further states that at each utterance the bird jerked its tail and threw back its head. Occasionally a low 'chuck,' audible for only a short distance, replaced the usual call. Mr. Stephens's notes come perhaps nearer the mark than my own; I know him to be an exceedingly careful, conscientious, and reliable observer. According to

Prince Max z. Wied, in Burmeister's 'Thiere Brasilien's' (Vol. II, 1856, p. 142), its call is said to be 'keck, keck, keck.' The best account of the life history of this little Owl is found in the Journal für Ornithologie (Vol. XVII, 1869, pp. 244, 245), under 'Notes on the Natural History of the Birds of Brazil,' by Carl Euler.

"According to this authority, small as the Ferruginous Pygmy Owl is, it has been known to carry off young chickens, and he was informed by the natives that it even attacked Jacú hens (*Penelope*), a bird of greater size than domestic fowls. It was stated to him that the little Owl fastened itself under the wings of the latter, gradually tearing it to pieces, and wearing it out and eventually killing it. I am aware, from personal observations, that some of our small Owls are the peer, as far as courage is concerned, of the noblest Falcon ever hatched, but I should not quite care to father that story. Carl Euler says, further, that in captivity, when fed on birds, it always carefully removed all the larger feathers from the carcass before beginning its meal. Also that it was not at all afraid of light, and that he met with it several times during bright sunshiny days, sitting on perfectly bare and leafless trees. He gives its call note as 'khiu, khiu.' Apparently none of us here mentioned agree on the call note of this Owl, and I leave it to the reader to take his choice.

"Euler surmises that it rears two broods a season, one in October the other in December. He once met in March a family of four, two adults and two young, sitting close together on a limb of a tree, waiting, as he says, for twilight. The nest is said to be made in hollow trees, but no mention is made of the eggs having been found, however, and I cannot find any description of them in any of the works accessible to me.

"A nest containing two fully fledged young found by me in a hole in an old mesquite tree in the spring of 1872, in a chaparral thicket near Camp Lowell, and referred to at the time as being that of *Micropallas whitneyi*, may possibly, and probably, have been one of this little Owl, as the Elf Owl seems to confine itself in its nesting sites mainly to excavations in giant cactus (*Cereus giganteus*), so far as known."

Since this account was published, Mr. George B. Sennett has secured the eggs of this species. He says: "On May 2, 1888, my collector took an adult female and an egg of this Owl at Cañon del Caballeros, near Victoria, Tamaulipas, Mexico. The locality is high and at the base of the more precipitous mountains. The nest was in a hollow tree and contained but a single fresh egg, which is white, shaped like that of a *Megascops*, measures 1.05 by 0.90 inches [about 26.7 by 22.9 millimetres], and is now in my collection with the parent bird. It will be observed that in size it is very close to the egg of *Micropallas whitneyi*."[1]

Since Mr. Sennett published the above he has received a set of four eggs of this species taken within our southern border, which, as well as the first mentioned egg, he has kindly allowed me to examine. The latter were

[1] Auk, Vol. VI, No. 1, January, 1889, p. 70.

found on May 3, 1890, and were apparently fresh. The nesting site was a Woodpecker's hole in a mesquite tree, about 10 feet from the ground, in thick woods near Brownsville, Texas. The eggs are oval in shape and measure, respectively, 28 by 23.5, 28 by 23.5, 27.5 by 24, and 27 by 23 millimetres.

Compared with the eggs of *Glaucidium gnoma californicum*, the shells are apparently much thicker, and are rather coarsely granulated, considering their small size, considerably more so than the egg of *Micropallas whitneyi*, and they are not as glossy as the latter. The texture of the shells is decidedly different from that of the eggs said to be those of the California Pygmy Owl. In none of the specimens before me are the peculiar punctures or pittings noticeable and purporting to be characteristic of the eggs of the preceding species. In fact, the reverse is rather the case, most of the specimens showing a few slight protuberances on their surface.

The type specimen figured on Pl. 12, Fig. 17, is the one taken near Victoria, Mexico, and now in Mr. G. B. Sennett's collection.

## 146. Micropallas whitneyi (Cooper).

ELF OWL.

*Athene whitneyi* Cooper, Proceedings of California Academy Sciences. 1861, 118.
*Micropallas whitneyi* Sennett, Auk, Vol. vi, 1889, 276.
(B —, C 331, R 411, C 486, U 381.)

Geographical range: Lower California and southwestern United States, from southeastern California and southern Arizona to southern Texas; south, to southern Mexico (Pueblo and Guanajuato).

The range of the Elf Owl, the smallest of our Owls found within the United States, extends from southeastern California (Mojave) southeastward through southern Arizona, where it is the commonest Owl in that Territory. Mr. George B. Sennett obtained a single specimen from Hidalgo County, Texas, taken on April 5, 1889, extending its range considerably in this direction. Mr. L. Belding reports it as not uncommon in the vicinity of Miraflores, Lower California, where he took several specimens in April, 1882, and it is likewise an inhabitant of the greater portion of Mexico.

Although probably a constant resident, and breeding wherever found, I believe its eggs have as yet only been taken in the vicinity of Tucson, southern Arizona.

Since Dr. J. G. Cooper obtained the type specimen near Mojave, California, April 26, 1861, no others have been taken in this State, and this point probably marks the extreme western and northern limit of its range. The type remained unique for eleven years, until I met with this little Owl again in April, 1872, in the vicinity of Tucson, Arizona.

The Elf Owls are nocturnal in their habits and are seldom seen moving about in the daytime, which they pass either in abandoned excavations of

Woodpeckers in trees and giant cactus, or in the densest thickets in the creek bottoms. I first met with the Elf Owl in April, 1872, my attention being drawn to it by its peculiar call notes, resembling the syllables "cha-cha, cha-cha," frequently repeated in different keys, sometimes quite distinct and again so low that they could not be heard more than 20 yards off. Although uttered in a rather tremulous tone there is nothing unpleasant in the sound, in fact it is rather the reverse. They become active shortly after sundown and were probably attracted to the vicinity of my camp by the guard fire, which was usually kept up all night. This also attracted numerous insects, on which these little fellows feed to a great extent.

On April 20, 1872, while pushing my way through a dense mass of willows in the Rillitto Creek bottom, I saw one of them perched in the thicket and shot it. Although I had made considerable noise, it allowed me to approach quite close and did not seem to be disturbed by my intrusion into its retreat. I took several others subsequently, most of them shortly after sundown, by carefully watching for the point from which they uttered their call notes. When they find themselves observed they sit quite erect and perfectly motionless, and may in such a position be easily mistaken for a part of the limb on which they are perched.

Mr. William Brewster published the following notes made by Mr. F. Stephens, while collecting for him in 1882. Referring to this species, he says: "I was walking past an elder bush in a thicket when a small bird started out. Thinking it had flown from its nest, I stopped and began examining the bush, when I discovered a Whitney's Owl sitting on a branch with its side toward me and one wing held up, shield fashion, before its face. I could just see its eyes over the wing, and had it kept them shut I might have overlooked it, as they first attracted my attention. It had drawn itself into the smallest possible compass so that its head formed the widest part of its outline. I moved around a little to get a better chance to shoot, as the bush was very thick, but whichever way I went the wing was always interposed, and when I retreated far enough for a fair shot, I could not tell the bird from the surrounding bunches of leaves. At length, losing patience, I fired at random and it fell. Upon going to pick it up I was surprised to find another which I had not seen before, and which must have been struck by a stray shot. Rather curiously both these specimens proved to be adult males. It is by no means positive, however, that the males are not, to a certain extent, gregarious during the breeding season, for on another occasion two more were killed from a flock of five which were sitting together in a thick bush. They had several different call notes, one of which sounded like the syllable 'churp,' while another was a low 'tro-jur-rrr.' These cries were heard at all times of the night, but more often in the early evening and again at daybreak."[1]

Mr. Herbert Brown writes me from Tucson, Arizona, as follows: "Their food consists largely of ants and beetles. I have examined more than a

[1] Bulletin Nuttall Ornithological Club, Vol. VIII, 1883, p. 28.

dozen of their stomachs, always with the same result, and am of the opinion that they do not prey upon either birds or mammals, however small. In dozens of excavations occupied by them I have failed to find a vestige of fur or feathers. In the spring of 1885 I raised five of their young. When I first took them they were little downy cottony things, blind, and not larger than the end of an ordinary sized man's thumb. I kept them until full grown and then sent three to the Zoölogical Garden in Philadelphia and two to the one in Cincinnati. They were fed with raw meat and did well. They are beautiful little creatures and perfectly harmless. I have taken dozens out of their holes, and, so far as I can remember, but one snapped its beak at me. When taken out they offer no resistance and make not the least attempt to get away, but will lie in the closed hand apparently dead. Release the grasp, however, but for one moment and they are gone. The first hostile demonstration I saw one make was a few days ago. I had taken two, a male and female, and placed them in a box, but shortly after, on adding another, the male previously captured raised his feathers on end and looking as wicked as it was possible for the little fellow to do, he began in true Owl fashion to sway his body from side to side and kept it up as long as I watched him. He so frightened the newcomer that it tried to escape, but failing in this, huddled down in the opposite corner of the box in apparent terror. This convinced me that notwithstanding their wonderful meekness the little fellows fight among themselves. During the rainy season they leave the sahuaras and take to the bush, at least none are found occupying such burrows at that time of the year, as I have repeatedly looked for them, but without success."

Two stomachs of the Elf Owl, kindly sent by Mr. Brown and turned over by me to Dr. C. Hart Merriam for examination, contained the following remains of food: One, taken on March 30, 1890, the remains of twenty beetles (*Trimytis*) and fragments of two ribs of a small mammal. Another, taken April 20, 1890, the remains of nineteen beetles and one grasshopper.

In southern Arizona nidification rarely begins before May 10, and lasts through this month and the first week in June. The favorite nesting sites of the Elf Owls are old Woodpeckers' holes in giant cactus, the sahuara of the natives. These grow frequently to a height of 30 and 40 feet, and the main trunk as well as the candelabra-like arms or branches are sometimes fairly riddled with these holes, many of which are undoubtedly bored simply for amusement, as they are easily excavated, and also furnish safe and cosy homes, a fact which these little Owls seem to have found out. Some of these holes are occasionally found as low as 4 feet, and again near the very tops of these curious plants, but more often from 10 to 20 feet from the ground. In very rare instances they nest in holes of trees, such as the mesquite and cottonwood.

As a rule only such cactus as grow along the lowlands of the river bottoms and the table-lands bordering them are selected to breed in. Mr.

Brown has repeatedly examined sahuaras out in the deserts without finding a single Owl in any of them, although they were full of suitable excavations. In a single instance he found one of these birds some distance away from the lowlands, near the summit of the Quijotoa Range, 90 miles southwest of Tucson, Arizona.

From two to five eggs are laid to a set, but the most common number found is three. Of thirty-eight sets taken by Mr. F. Stephens, who found the first eggs of this species, twenty-four sets contained three each, twelve sets contained four, and two sets five eggs. The cavities in which they are deposited are usually about 10 inches deep. There is no nest, the eggs simply lying on the dry chips in the bottom of the hole. One of the parents is always at home after the first egg is laid, and frequently both. The male assists in incubation, which lasts about two weeks. The eggs of the Elf Owl are pure white in color and oval in shape, the shell is finely granulated, and while some specimens are rather glossy, the majority are only moderately so.

The average measurement of twenty-three specimens in the U. S. National Museum collection, all taken by Mr. E. W. Nelson, is 27 by 23 millimetres. The largest of these eggs measures 28.5 by 24, the smallest 25 by 22.5 millimetres.

The type specimen, No. 22134, was taken by the above mentioned gentleman near Fort Lowell, Arizona, May 25, 1884. The set contained three eggs. The specimen is figured on Pl. 12, Fig. 13.

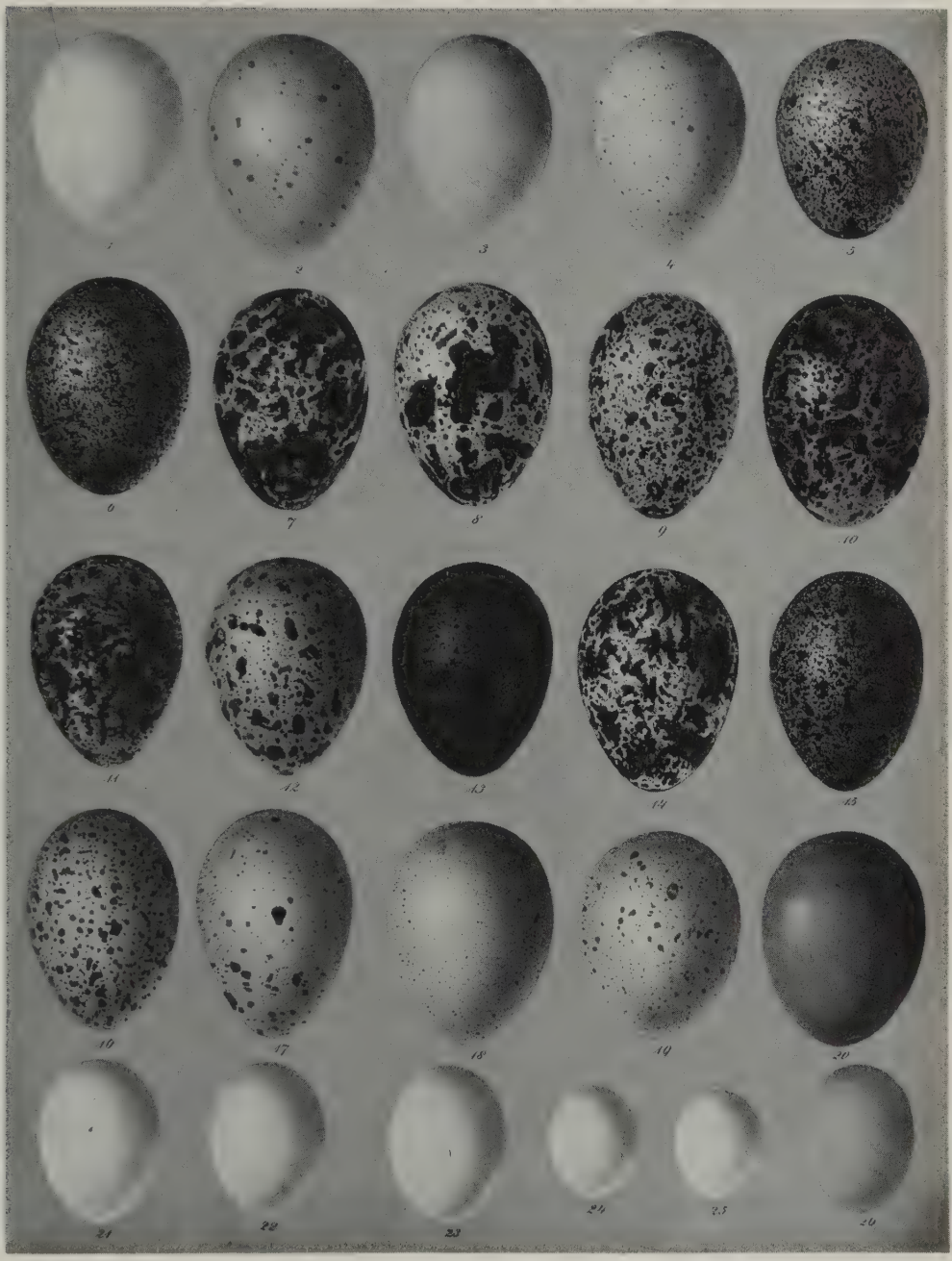
## EXPLANATION TO PLATE I.

Fig. 1. Colinus virginianus, *Linnæus.* Bob White.
Figs. 2, 3. Oreortyx pictus plumiferus, Gould. Plumed Partridge.
Figs. 4, 5. Callipepla squamata, Vigors. Scaled Partridge.
Figs. 6, 7. Callipepla squamata castanogastris, Brewster. Chestnut-bellied Scaled Partridge.
Figs. 8, 9, 10. Callipepla californica, Shaw. California Partridge.
Figs. 11, 12, 13, 14. Callipepla gambeli, Nuttall. Gambel's Partridge.
Fig. 15. Cyrtonyx montezumæ, Vigors. Massena Partridge.
Figs. 16, 17, 18, 19. Dendragapus obscurus fuliginosus, Ridgway. Sooty Grouse.
Figs. 20, 21, 22, 23. Dendragapus canadensis, Linnæus. Canada Grouse.

Lith by Ketterlinus, Phila.

## EXPLANATION TO PLATE II.

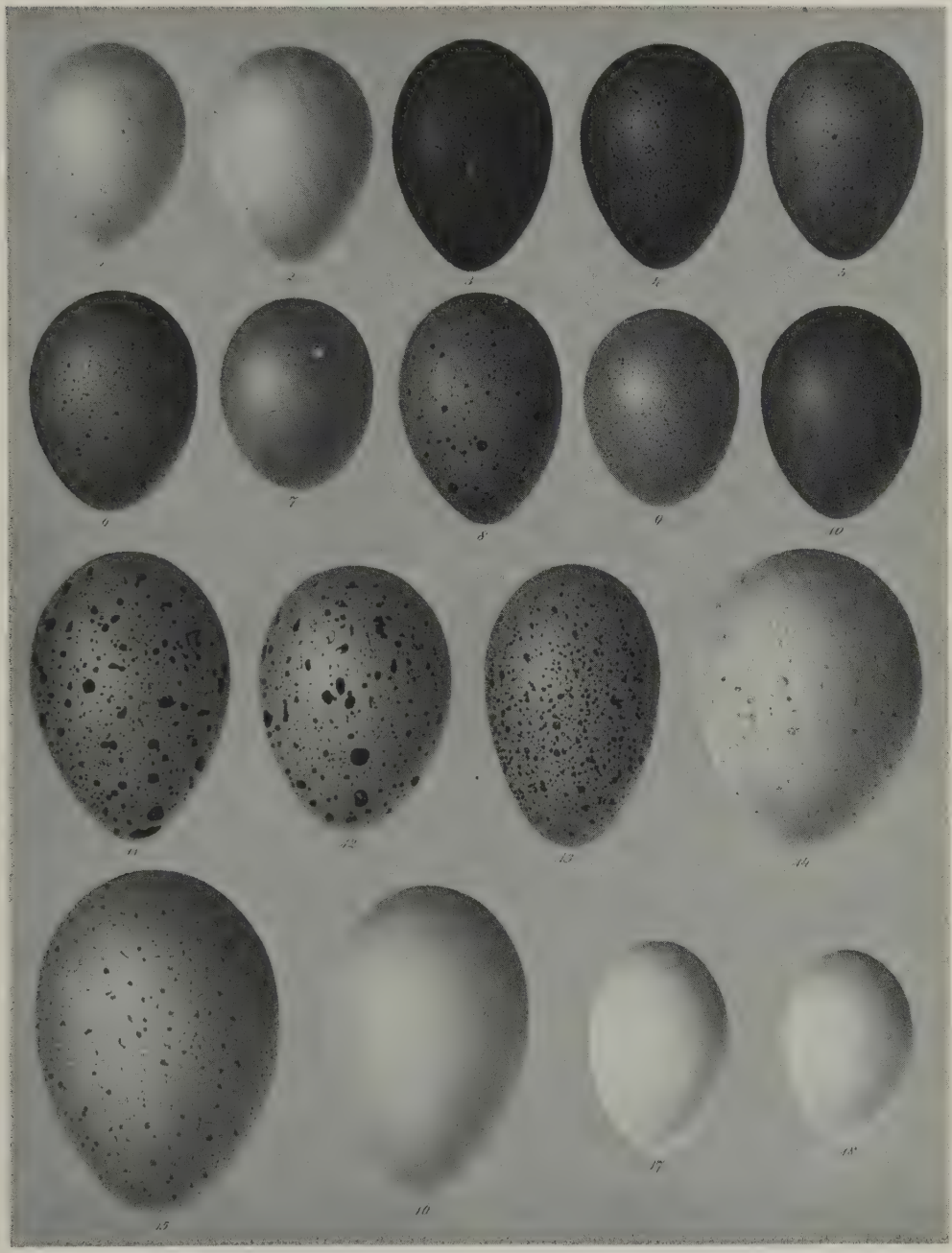
Fig. 1. Bonasa umbellus, Linnæus. Ruffed Grouse.
Fig. 2. Bonasa umbellus togata, Linnæus. Canadian Ruffed Grouse.
Fig. 3. Bonasa umbellus umbelloides, Douglas. Gray Ruffed Grouse.
Fig. 4. Bonasa umbellus sabini, Douglas. Oregon Ruffed Grouse.
Figs. 5, 6, 7, 8, 9, 10. Lagopus lagopus, Linnæus. Willow Ptarmigan.
Figs. 11, 12, 13, 14, 15. Lagopus rupestris, Gmelin. Rock Ptarmigan.
Figs. 16, 17. Lagopus leucurus, Swainson. White-tailed Ptarmigan.
Figs. 18, 19, 20. Tympanuchus americanus, Reichenbach. Prairie Hen.
Fig. 21. Zenaida zenaida, Bonaparte. Zenaida Dove.
Fig. 22. Engyptila albifrons, Bonaparte. White-fronted Dove.
Fig. 23. Melopelia leucoptera, Linnæus. White-winged Dove.
Fig. 24. Columbigallina passerina pallescens, Baird. Mexican Ground Dove.
Fig. 25. Scardafella inca, Lesson. Inca Dove.
Fig. 26. Geotrygon montana, Linnæus. Ruddy Quail Dove.




Lith. by Kerr & Smith, Phila.

## EXPLANATION TO PLATE III.

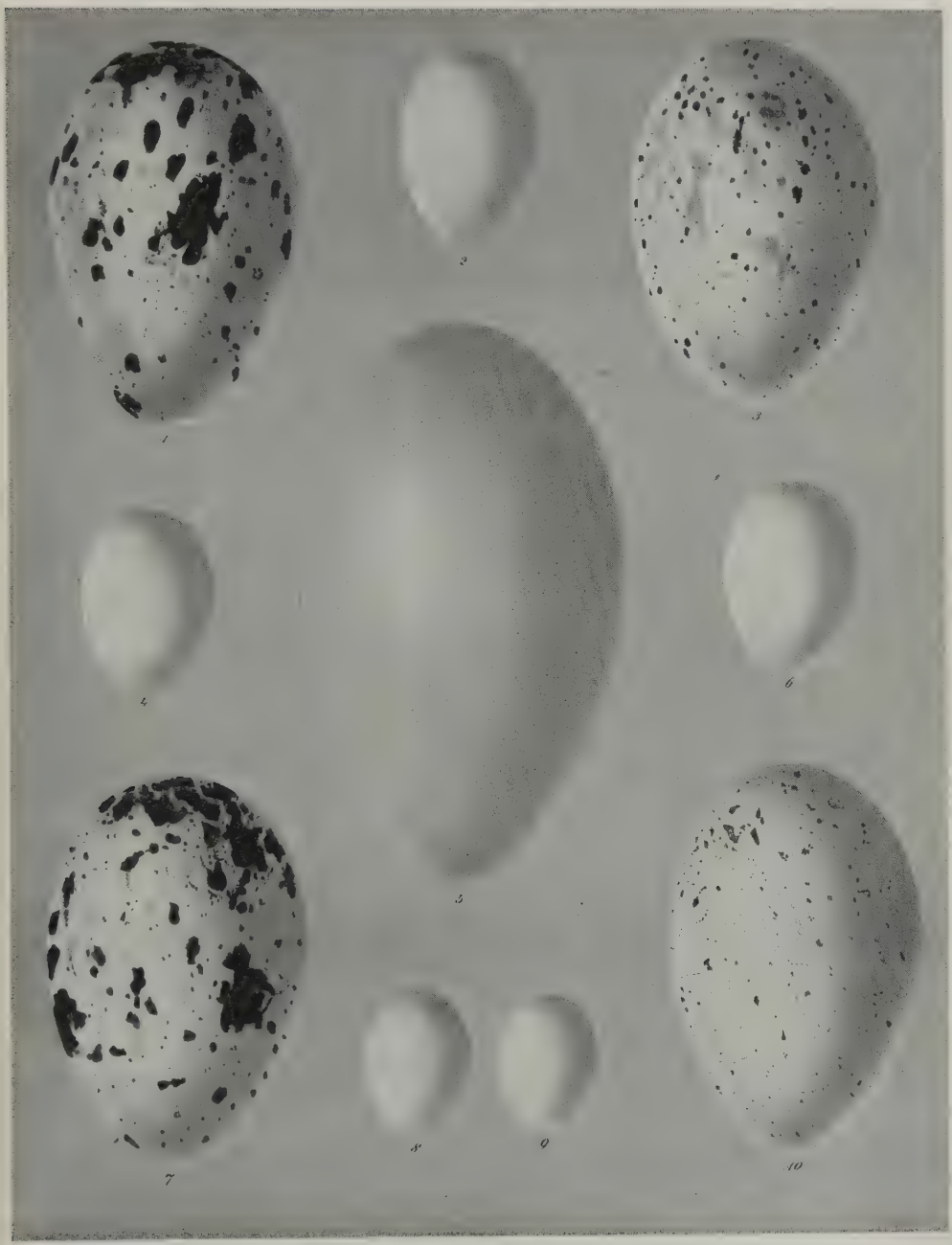
Fig. 1. Tympanuchus pallidicinctus, Ridgway. Lesser Prairie Hen.
Fig. 2. Tympanuchus cupido, Linnæus. Heath Hen.
Figs. 3, 4, 5. Pediocætes phasianellus, Linnæus. Sharp-tailed Grouse.
Figs. 6, 7, 8. Pediocætes phasianellus columbianus, Ord. Columbian Sharp-tailed Grouse.
Figs. 9, 10. Pediocætes phasianellus campestris, Ridgway. Prairie Sharp-tailed Grouse.
Figs. 11, 12, 13. Centrocercus urophasianus, Bonaparte. Sage Grouse.
Fig. 14. Meleagris gallopavo, Linnæus. Wild Turkey.
Fig. 15. Meleagris gallopavo mexicana, Gould. Mexican Turkey.
Fig. 16. Ortalis vetula maccalli, Baird. Chachalaca.
Fig. 17. Columba fasciata, Say. Band-tailed Pigeon.
Fig. 18. Columba fasciata vioscæ, Brewster. Viosca's Pigeon.




Lith by Ketterlinus, Phila.

## EXPLANATION TO PLATE IV.

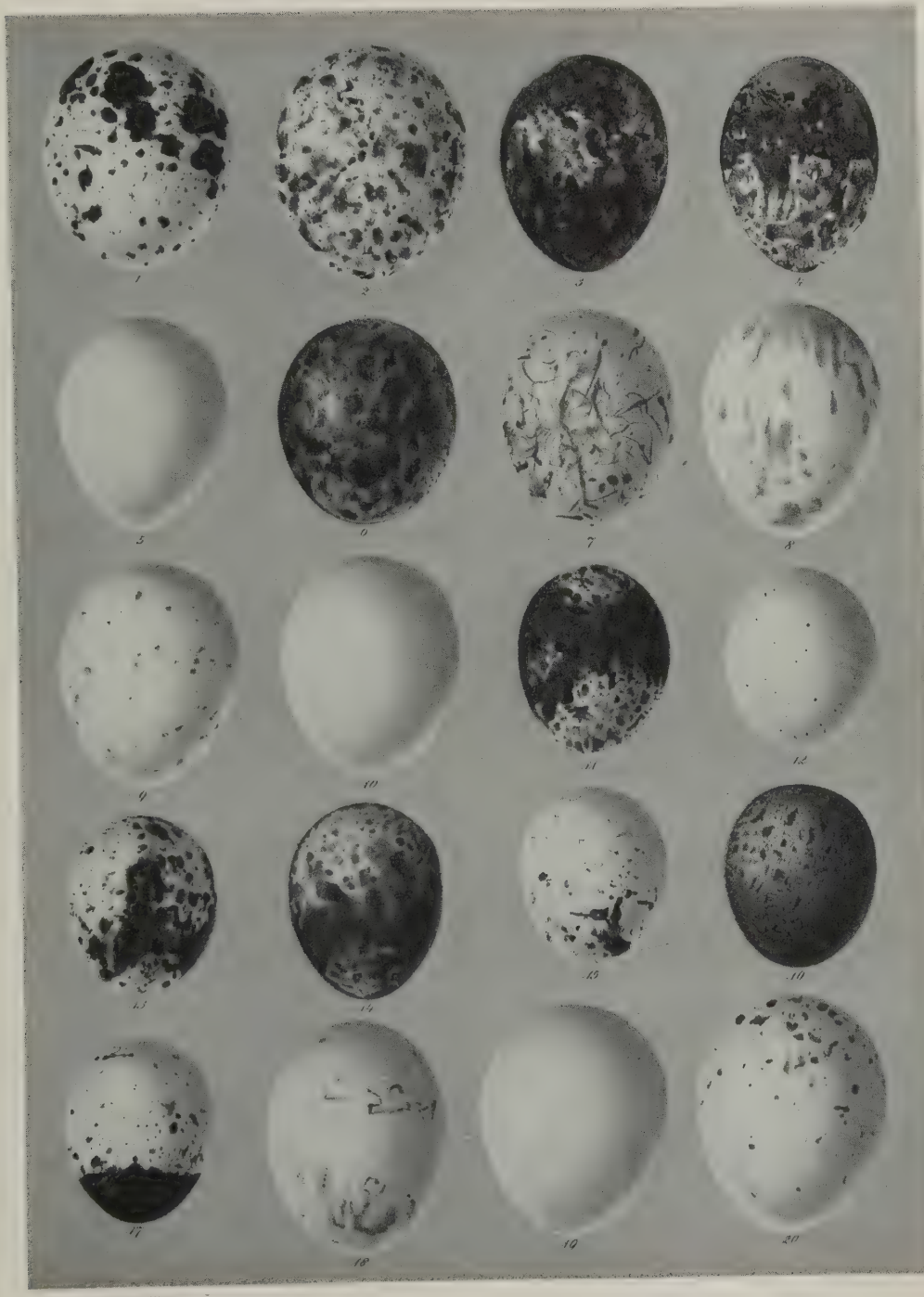
Figs. 1, 3. Carthartes aura, Linnæus. Turkey Vulture.
Fig. 2. Columba flavirostris, Wagler. Red-billed Pigeon.
Fig. 4. Columba leucocephala, Linnæus. White-crowned Pigeon.
Fig. 5. Pseudogryphus californianus, Shaw. California Vulture.
Fig. 6. Ectopistes migratorius, Linnæus. Passenger Pigeon.
Figs. 7, 10. Catharista atrata, Bartram. Black Vulture.
Figs. 8, 9. Zenaidura macroura, Linnæus. Mourning Dove.




Lith by Rothenhaus, Phila.

## EXPLANATION TO PLATE V.

Figs. 1, 2. Elanoides forficatus, Linnæus. Swallow-tailed Kite.
Figs. 3, 4. Elanus leucurus, Vieillot. White-tailed Kite.
Fig. 5. Ictinia mississippiensis, Wilson. Mississippi Kite.
Figs. 6, 7. Rostrhamus sociabilis, Vieillot. Everglade Kite.
Figs. 8, 9, 10. Circus hudsonius, Linnæus. Marsh Hawk.
Figs. 11, 12, 13.
14, 15, 16.
17. Accipiter velox, Wilson. Sharp-shinned Hawk.
Figs. 18, 19, 20. Accipiter cooperi, Bonaparte. Cooper's Hawk.



Lith. by Ketterlinus Phila.

EXPLANATION TO PLATE VI.

Fig. 1. Accipiter atricapillus, Wilson. American Goshawk.
Fig. 2. Accipiter atricapillus striatulus, Ridgway. Western Goshawk.
Figs. 3, 4. Parabuteo unicinctus harrisi, Audubon. Harris's Hawk.
Figs. 5, 6. Buteo borealis, Gmelin. Red-tailed Hawk.
Figs. 7, 8. Buteo borealis calurus, Cassin. Western red-tailed Hawk.
Fig. 9. Buteo lineatus elegans, Cassin. Red-bellied Hawk.

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## EXPLANATION TO PLATE VII.

Figs. 1, 2, 3, 4, 5. Buteo lineatus, Gmelin. Red-shouldered Hawk.
Fig. 6. Buteo abbreviatus, Cabanis. Zone-tailed Hawk.
Fig. 7. Asturnia plagiata, Schlegel. Mexican Goshawk.
Figs. 8, 9. Buteo albicaudatus, Vieillot. White-tailed Hawk.
Figs. 10, 11, 12, 13. Buteo latissimus, Wilson. Broad-winged Hawk.

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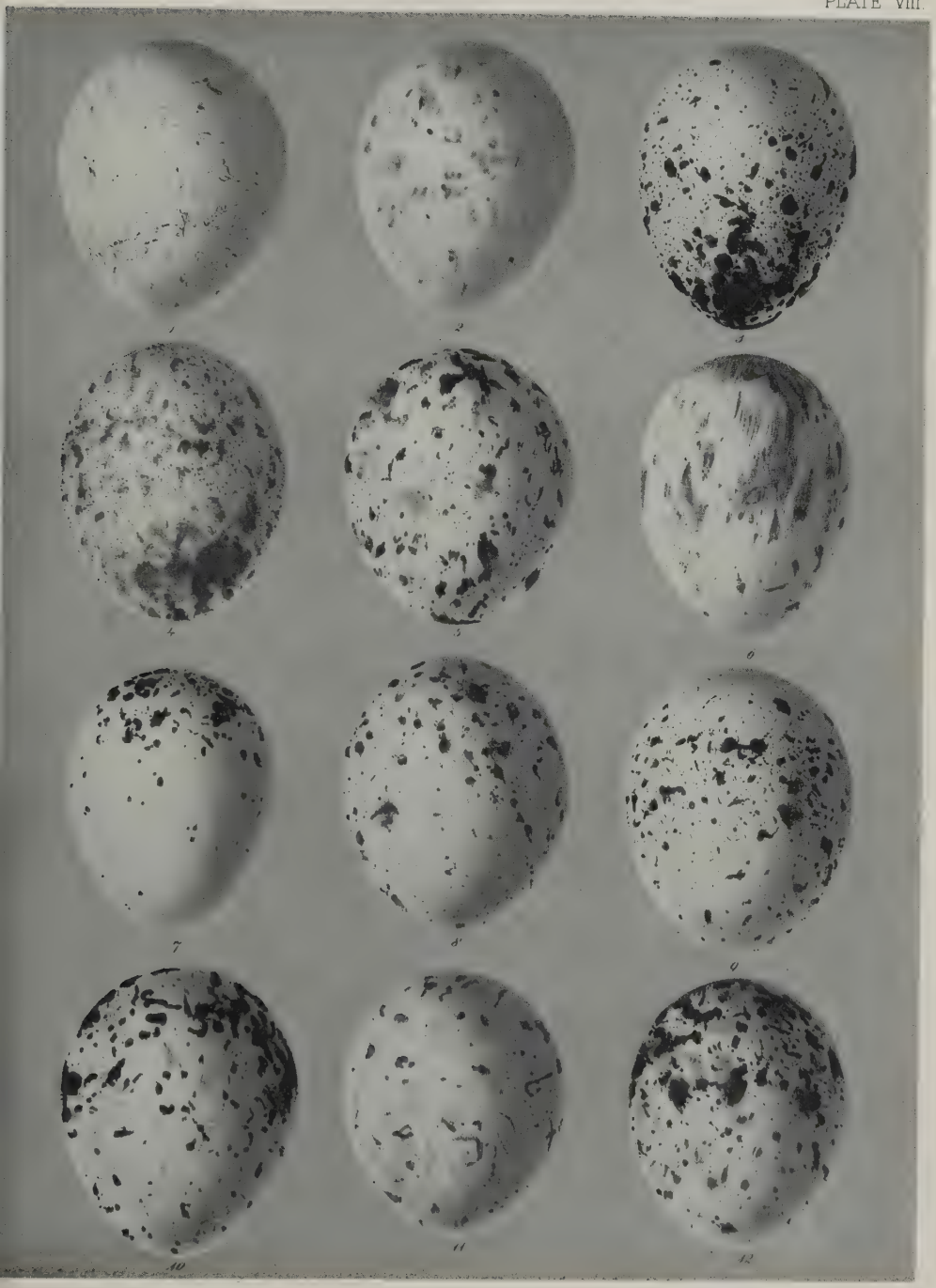
## EXPLANATION TO PLATE VIII.

Figs. 1, 2, 3, 4, 5, 6. Buteo swainsoni, Bonaparte. Swainson's Hawk.
Fig. 7. Buteo brachyurus, Vieillot. Short-tailed Hawk.
Figs. 8, 9. Urubitinga anthracina, Lichtenstein. Mexican Black Hawk.
Figs. 10, 11, 12. Archibuteo lagopus sancti-johannis, Gmelin. American Rough-legged Hawk.



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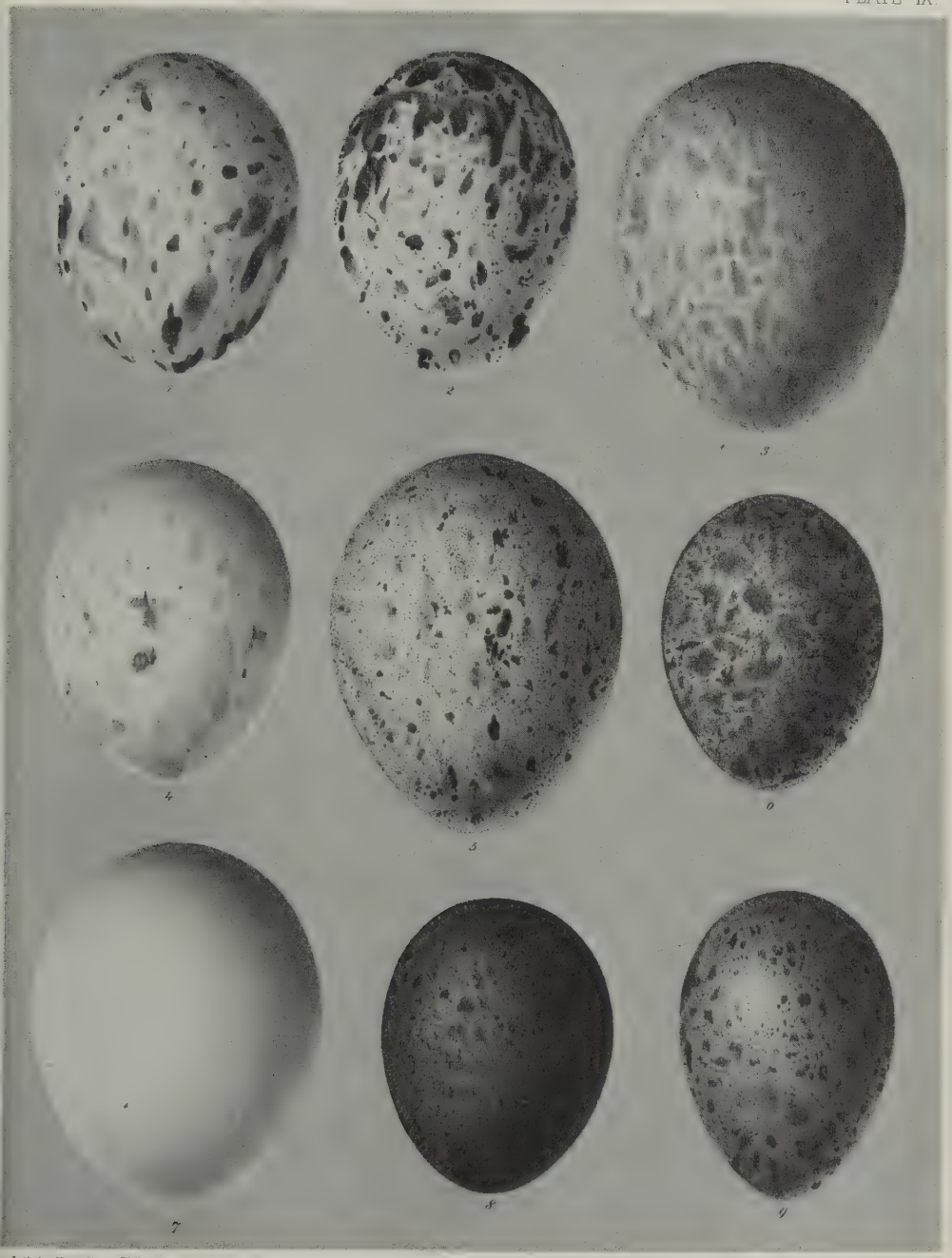
## EXPLANATION TO PLATE IX.

Figs. 1, 2, 4. Archibuteo ferrugineus, Lichtenstein. Ferruginous Rough-legged Hawk.
Figs. 3, 5. Aquila chrysaëtos, Linnæus. Golden Eagle.
Figs. 6, 8, 9. Falco rusticolus gyrfalco, Linnæus. Gyrfalcon.
Fig. 7. Haliæetus leucocephalus, Linnæus. Bald Eagle.



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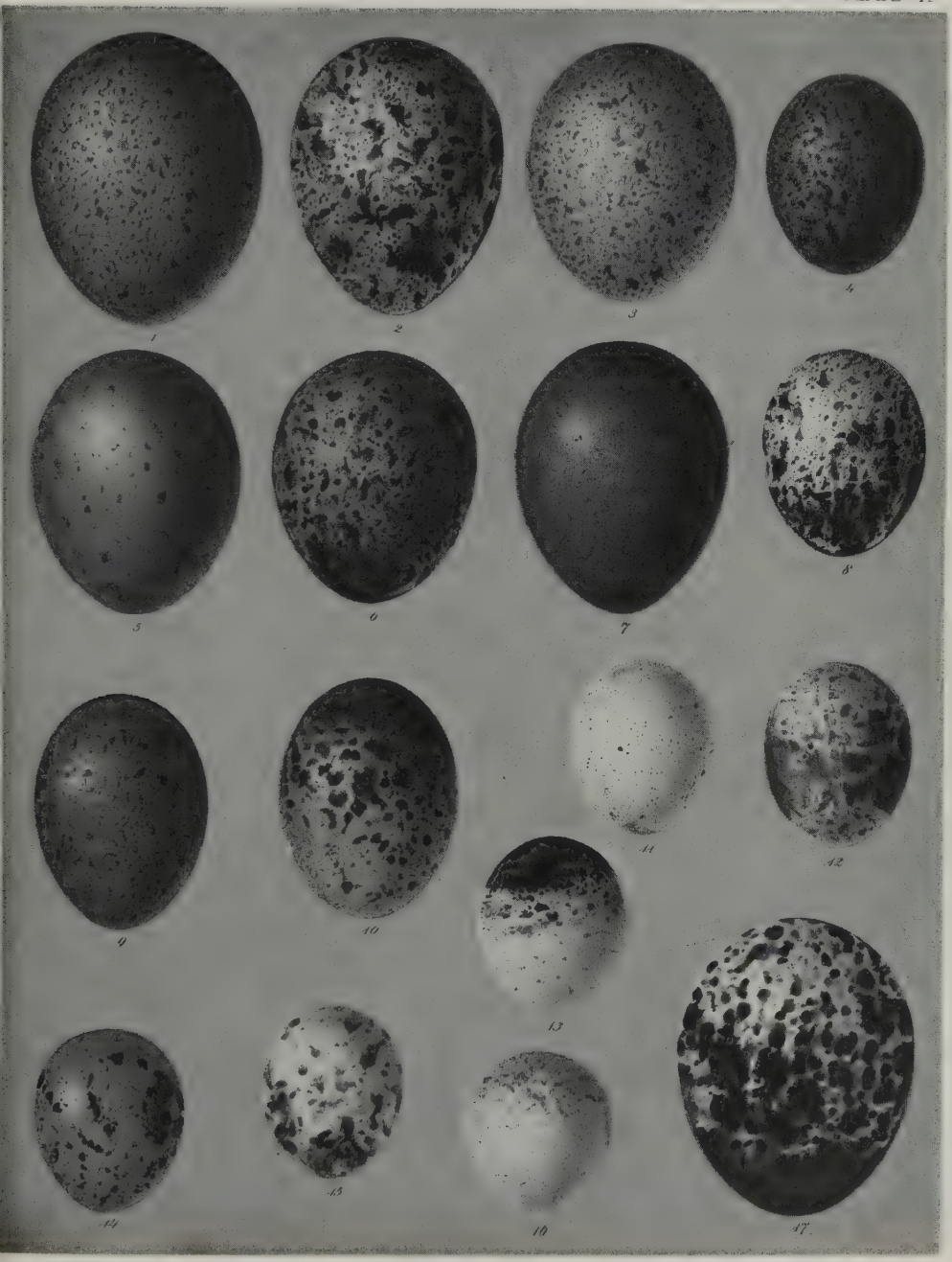
## EXPLANATION TO PLATE X.

Fig. 1. Falco rusticolus obsoletus, Gmelin. Black Gyrfalcon.
Figs. 2, 3. Falco mexicanus, Schlegel. Prairie Falcon.
Figs. 4, 8. Falco columbarius, Linnæus. Pigeon Hawk.
Figs. 5, 6, 7. Falco peregrinus anatum, Bonaparte. Duck Hawk.
Figs. 9, 10. Falco fusco-cœrulescens, Vieillot. Aplomado Falcon.
Figs. 11, 12, 13, 14, 15, 16. Falco sparverius, Linnæus. American Sparrow Hawk.
Fig. 17. Pandion haliaëtus carolinensis, Gmelin. American Osprey.

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## EXPLANATION TO PLATE XI.

Figs. 1, 2, 3, 4. Polyborus cheriway, Jacquin. Audubon's Caracara.
Figs. 5, 6, 7, 8, 9. Pandion haliaëtus carolinensis, Gmelin. American Osprey.

PLATE XI.

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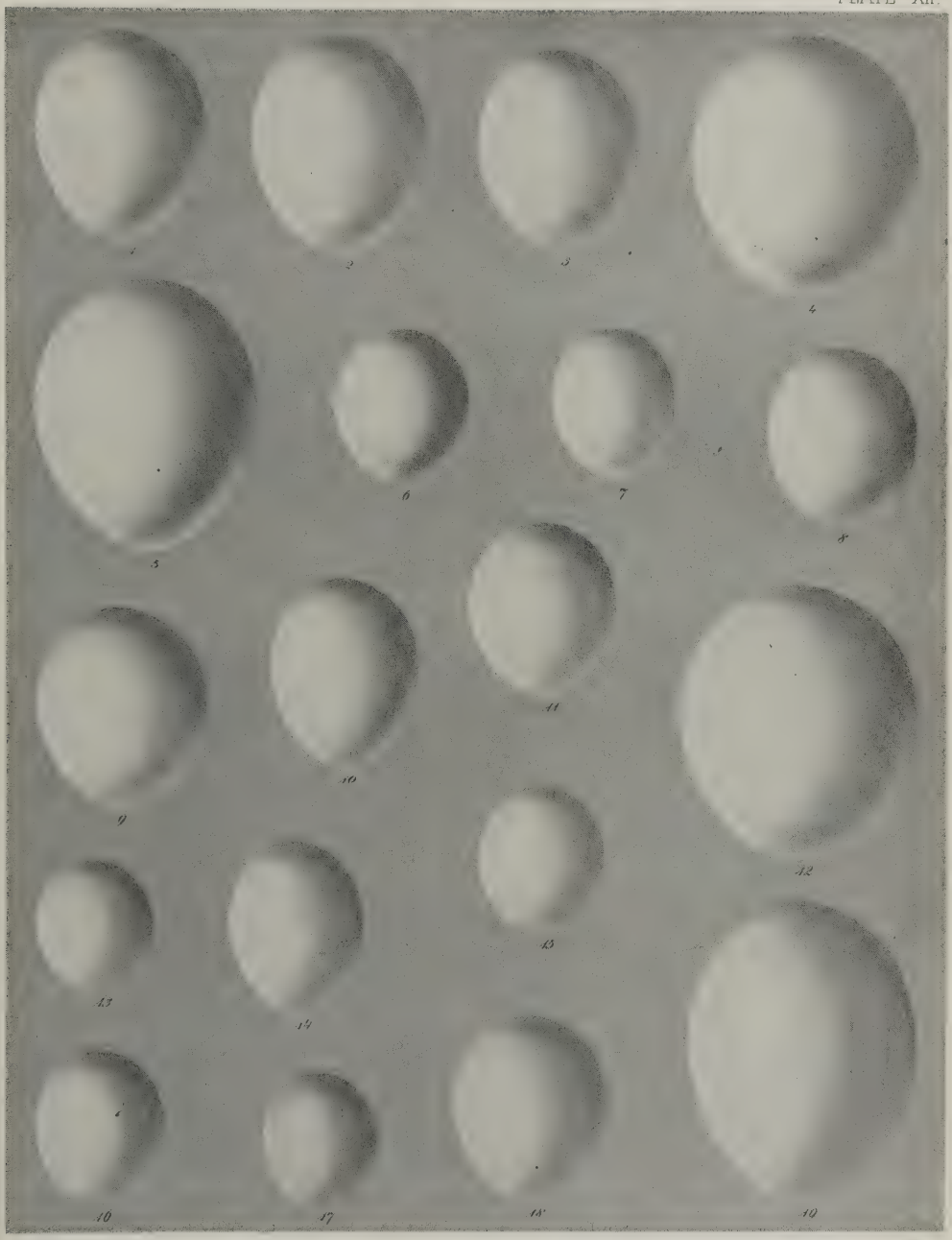
## EXPLANATION TO PLATE XII.

Fig. 1. Strix pratincola, Bonaparte. American Barn Owl.
Fig. 2. Asio wilsonianus, Lesson. American Long-eared Owl.
Fig. 3. Asio accipitrinus, Pallas. Short-eared Owl.
Fig. 4. Syrnium nebulosum, Forster. Barred Owl.
Fig. 5. Scotiaptex cinerea, Gmelin. Great Gray Owl.
Fig. 6. Nyctala tengmalmi richardsoni, Bonaparte. Richardon's Owl.
Fig. 7. Nyctala acadica, Gmelin. Saw-whet Owl.
Fig. 8. Megascops asio, Linnæus. Screech Owl.
Fig. 9. Megascops asio macfarlanei, Brewster. MacFarlane's Screech Owl.
Fig. 10. Megascops asio maxwelliæ, Ridgway. Rocky Mountain Screech Owl.
Fig. 11. Megascops asio trichopsis, Wagler. Mexican Screech Owl.
Fig. 12. Bubo virginianus, Gmelin. Great Horned Owl.
Fig. 13. Micropallas whitneyi, Cooper. Elf Owl.
Fig. 14. Speotyto cunicularia hypogæa, Bonaparte. Burrowing Owl.
Fig. 15. Megascops flammeolus, Kaup. Flammulated Screech Owl.
Fig. 16. Speotyto cunicularia floridana, Ridgway. Florida Burrowing Owl.
Fig. 17. Glaucidium phalænoides, Daudain. Ferruginous Pigmy Owl.
Fig. 18. Surnia ulula caparoch, Müller. American Hawk Owl.
Fig. 19. Nyctea nyctea, Linnæus. Snowy Owl.

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SMITHSONIAN INSTITUTION.
UNITED STATES NATIONAL MUSEUM.
SPECIAL BULLETIN.

# LIFE HISTORIES

OF

# NORTH AMERICAN BIRDS,

FROM THE PARROTS TO THE GRACKLES,

WITH SPECIAL REFERENCE TO

# THEIR BREEDING HABITS AND EGGS,

BY

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*Member of the American Ornithologists' Union.*

WITH

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# ADVERTISEMENT.

This work (Special Bulletin No. 3) is one of a series of papers intended to illustrate the collections belonging to, or placed in charge of, the Smithsonian Institution, and deposited in the United States National Museum. It supplements Special Bulletin No. 1, by the same author, which containes descriptions of the breeding habits and eggs of the gallinaceous birds, pigeons, doves, and birds of prey.

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The Bulletin of the United States National Museum, the publication of which was commenced in 1875, consists of elaborate papers based upon the collections of the Museum, reports of expeditions, etc. The Proceedings are intended to facilitate the prompt publication of freshly acquired facts relating to biology, anthropology, and geology, descriptions of restricted groups of animals and plants, discussions of particular questions relative to the synonymy of species, and the diaries of minor expeditions.

Other papers of more general popular interest are printed in the appendix to the annual report.

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S. P. Langley,
*Secretary of the Smithsonian Institution.*

Washington, D. C., *June 10, 1895.*

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# INTRODUCTION.

This volume on the Life Histories of North American Birds, like the one preceding, is based on the collections in the United States National Museum, and relates only to land birds. The classification given in the Code and Check List of the American Ornithologists' Union has again been followed, and the species and subspecies have been treated in a manner similar to that adopted in the earlier volume.

Since the publication of the initial volume the oölogical collection has been very materially increased. Dr. William L. Ralph, of Utica, New York, has, with commendable liberality, presented his entire collection, numbering over seven thousand specimens, to the Smithsonian Institution. This contains beautifully prepared sets of the eggs of many of the rarer species, quite a number of which have heretofore been unrepresented. To this collection our generous friend is constantly adding, regardless of expense.

My thanks are especially due to Dr. Ralph and to my numerous correspondents whose names appear in the body of this volume; by the kind cooperation of these gentlemen I have been greatly aided in the preparation of this work. I am also indebted to the United States Department of Agriculture for the many courtesies extended through Dr. C. Hart Merriam, who has given me access to the collections and furnished me with the results of the investigations made by this Department.

The original water-color drawings from which the plates have been reproduced, like those of the former volume, are the work of Mr. John L. Ridgway, of Washington, District of Columbia, and of the same standard of excellence. The chromo-lithographic reproductions are by the Ketterlinus Printing Company, of Philadelphia, Pennsylvania, and I am pleased to be able to say that they come up fully to my expectations. The illustrations are all natural size.

THE AUTHOR.

# LIFE HISTORIES OF NORTH AMERICAN BIRDS.

By Charles Bendire, *Captain and Brevet Major, U. S. Army (retired).*

## PSITTACEOUS BIRDS.

### Family PSITTACIDÆ. Parrots, Paroquets, etc.

### 1. Conurus carolinensis (Linnæus).

CAROLINA PAROQUET.

*Psittacus carolinensis* Linnæus, Systema Naturæ, ed. 10, I, 1758, 97.
*Conurus carolinensis* Lesson, Traité d'Ornithologie, 1831, 211.
(B 65, C 315, R 392, C 460, U 382.)

Geographical range: Florida and the Indian Territory, sporadically only; casually along the Gulf coast and the Lower Mississippi Valley, north to southwestern Missouri.

The range of the Carolina Paroquet, the only representative in the United States of this numerous family, is yearly becoming more and more restricted, and is now mainly confined to some of the less accessible portions of southern Florida, and to very limited areas in the sparsely settled sections of the Indian Territory, where it is only a question of a few years before its total extermination will be accomplished. Formerly this species had quite an extensive distribution in the United States, ranging from Florida, the Gulf, and the South Atlantic States generally, north to Maryland, Pennsylvania, Ohio, Indiana, Illinois and Nebraska, and casually even to Michigan and New York, while west it reached to Texas and eastern Colorado. It was especially common then throughout the entire Mississippi Valley and the heavily timbered bottom lands of the larger tributaries of this stream.

With the more general settlement of the regions inhabited by these birds, their numbers have gradually but steadily diminished, and even as early as 1832 Audubon speaks of their not being nearly as common as formerly. As late, however, as 1860 they were still comparatively numerous throughout the Gulf States and the Mississippi, Arkansas, and White River valleys; and I well remember seeing large flocks of these birds throughout that year in the vicinity of Fort Smith, Arkansas, and near several of the military posts in the Indian Territory.

At present it is very doubtful if the Carolina Paroquet can be considered a regular resident anywhere excepting the localities already mentioned, and it is rapidly disappearing from these, especially the Indian Territory. Occasionally a pair are still seen in southern Louisiana, and as late as the fall of 1891 Mr. Thurman S. Powell saw a couple at the Linchpin Camping Grounds, Stone County, Missouri. Although rather restless birds at all times, they can generally be considered as residents wherever found, roving about from place to place in search of suitable feeding grounds, and usually returning to the same roosting place, some large hollow tree, to which they retire at night, hooking or suspending themselves by their powerful beaks and claws to the inner rough wall of the cavity.

Previous to the more extensive settlement of the country, their food consisted of the seeds of the cocklebur (*Xantheum strumarium*), the round seed balls of the sycamore, those of the cypress, pecan and beech nuts, the fruit of the papaw, (*Asimina trilobata*), mulberries, wild grapes, and various other wild berries. According to Mr. J. F. Menge, they also feed on the seeds extracted from pine cones and those of the burgrass, or sand bur (*Cenchras tribuloides*), one of the most noxious weeds known. They are also rather fond of cultivated fruit, and in Florida they have acquired a taste for both oranges and bananas. They are also partial to different kinds of grains while in the milk. Mr. Frank M. Chapman states that while collecting on the Sebastian River, Florida, in March, 1890, he found them feeding on the milky seeds of a species of thistle (*Cirsium lecontei*), which, as far as he could learn, constituted their entire food at that season. He says: "Not a patch of thistles did we find which had not been visited by them, the headless stalks showing clearly where the thistles had been neatly severed by the sharp, chisel-like bill, while the ground beneath favorite trees would be strewn with the scattered down."[1]

According to the observations of Mr. August Koch, published in "Forest and Stream," September 24, 1891, they also feed on the red blossoms of a species of maple (*Acer rubrum*). In the vicinity of Fort Smith, Arkansas, during the fall and winter of 1860–61, I frequently saw flocks of these birds in osage orange trees, which attain a large size here, biting off the fruit and feeding on the tender buds; here they were also accused of doing considerable injury to Indian corn while still in the milk, and many were shot for this reason, and there is no doubt that they do more or less damage to both fruit and grain.

Although clumsy-looking birds on the ground, it is astonishing how readily they move about on the slenderest limbs in trees, frequently hanging head down, like Crossbills and Redpolls, nipping off the seed bulbs of the sycamores, etc., and swinging themselves, with the assistance of their powerful beaks, from the extremity of one branch to another.

Their flight, which is more or less undulating, resembles both that of the Passenger Pigeon and again that of the Falcons; it is extremely swift and graceful, enabling them, even when flying in rather compact flocks, to dart in

[1] Proceedings of the Linnæan Society, New York, for the year ending March 7, 1890.

and out of the densest timber with perfect ease. Their call notes are shrill and disagreeable, a kind of grating, metallic shriek, and they are especially noisy while on the wing. Among the calls is one resembling the shrill cry of a goose, which is frequently uttered for minutes at a time. Formerly they moved about in good-sized and compact flocks, often numbering hundreds, while now it is a rare occurrence to see more than twenty together, more often small companies of from six to twelve. When at rest in the middle of the day on some favorite tree they sometimes utter low notes, as if talking to each other, but more often they remain entirely silent, and are then extremely difficult to discover as their plumage harmonizes and blends thoroughly with the surrounding foliage.

They are most active in the early morning and again in the evening, while the hotter parts of the day are spent in thick-foliaged and shady trees. They are partial to heavily timbered bottom lands bordering the larger streams and the extensive cypress swamps which are such a common feature of many of our Southern States. Social birds as they are, they are rarely seen alone, and if one is accidentally wounded, the others hover around the injured one until sometimes the whole flock is exterminated. This devotion to one another has cost them dearly, and many thousands have been destroyed in this way.

Mr. E. A. McIlhenny has kindly furnished me with the following notes on their habits as observed by him in southern Louisiana, where the species was still comparatively abundant a few years ago, but has now nearly disappeared:

"The Carolina Paroquet may be looked for in this section about April 25, or when the black mulberries begin to ripen. This fruit seemed to be their favorite food, and in the morning, from sunrise to about 7 o'clock, and in the evening, from 5 o'clock to sunset, at which hours they feed, they were to be found in the mulberry groves. They spent the rest of the day and roosted at night in the live-oak timber. In the morning, just before sunrise, they mounted the tallest trees, congregating in small bands, all the while talking at a great rate. As the sun rises they take flight for the nearest mulberry grove, where they partake of their morning meal amidst a great amount of noise. After they have eaten their fill they generally go to the nearest stream, where they drink and bathe; they then go to some dense oak timber, where they pass the heat of the day. After they get in the oaks they rarely utter a sound. In the afternoon they go through the same performance, with the exception of going to the water.

"The flight of the Carolina Paroquet, once seen, is never to be forgotten; it is undulating, somewhat like the woodpecker's, but very swift. While on the wing they chatter and cry continually; this cry sounds like 'qui,' with the rising inflection on the i; this is repeated several times, the last one being drawn out like 'qui-i-i-i.' These birds are rarely met with in the summer, and I do not think they nest here. They are most plentiful in May and September. In the fall they feed on the fruit of the honey locust, and are then more often seen on the ground."

The total extermination of the Carolina Paroquet is only a question of a few more years, and the end of the present century will probably mark their

disappearance. Civilization does not agree with these birds, and as they certainly do some damage to fruit in sections where they still exist, nothing else than complete annihilation can be looked for. Like the Bison and the Passenger Pigeon, their days are numbered.

Considering how common this bird was only a few decades ago, it is astonishing how little is really known about its nesting habits, and it is not likely that we will be able to learn much more about them. The general supposition is that they breed in hollow trees, such as cypress, oak, and sycamore, and that they nest rather early in the season, while others think they nest rather late. There are two eggs in the United States National Museum collection, No. 17709, in rather poor condition, which are entered as having been taken in St. Mary's Parish, Louisiana, March, 1878. I have endeavored to obtain some further particulars about them, but have been unsuccessful. One egg laid in captivity by a bird in the possession of Mr. R. Ridgway was deposited in August, 1877, and another in July, 1878, and one in September, 1883. There are also a couple of eggs in the collection of the American Museum of Natural History, New York City, collected by the late Dr. S. W. Wilson, of Georgia, which I believe are genuine; these are said to have been taken on April 26, 1855, from a hollow tree, the eggs being deposited on a few chips in the cavity; the exact locality where they were obtained is not given, but the collection was chiefly made on St. Simon Island and in Wayne and McIntosh counties, Georgia.

Mr. William Brewster, of Cambridge, Massachusetts, ever alert to obtain new information about the habits of our birds, while on a visit to Florida elicited the following, published by him in "The Auk" (Vol. VI, 1889, pp. 336, 337), which is well worth inserting here. He says: "While in Florida, during February and March, 1889, I questioned everybody whom I met regarding the nesting of the Parrakeet. Only three persons professed any knowledge on this subject. The first two were both uneducated men, professional hunters of alligators and plume birds. Each of them claimed to have seen Parrakeets' nests, which they described as flimsy structures built of twigs and placed on the branches of cypress trees. One of them said he found a nest only the previous summer (1888), while fishing. By means of his pole he tipped the nest over and secured two young birds which it contained. This account was so widely at variance with what has been previously recorded regarding the manner of nesting of this species that I considered it at the time as a mere fabrication, but afterwards it was unexpectedly and most strongly corroborated by Judge R. L. Long, of Tallahassee. The latter gentleman, who, by the way, has a very good general knowledge of the birds of our Northern States, assured me that he had examined many nests of the Parrakeet built precisely as above described. Formerly, when the birds were abundant in the surrounding region, he used to find them breeding in large colonies in the cypress swamps. Several of these colonies contained at least a thousand birds each. They nested invariably in small cypress trees, the favorite position being on a fork near the end of a slender horizontal branch.

"Every such fork would be occupied, and he has seen as many as forty or fifty nests in one small tree. Their nests closely resembled those of the Carolina Dove, being similarly composed of cypress twigs put together so loosely that the eggs were often visible from the ground beneath. The twigs of the cypress seemed to be preferred to those of any other kind of tree. The height at which the nests were placed varied from 5 or 6 feet to 20 or 30 feet. Mr. Long described the eggs as being of a greenish-white color, unspotted. He did not remember the maximum number which he had found in one set, but thought it was at least four or five. He had often taken young birds from the nests to rear or to give to his friends. He knew of a small colony of Parrakeets breeding in Waukulla Swamp, about 20 miles from Tallahassee, in the summer of 1885, and believes that they still occur there in moderate numbers.

"It seems difficult to reconcile such testimony with the statements of Audubon, Wilson, and others that the Carolina Parrakeet lays its eggs in hollow trees. It may be, however, that, like the Crow Blackbird, and some of the Owls, this Parrot nests both in holes and on branches, according to circumstances; at all events the above account has seemed to me to rest on evidence sufficiently good to warrant its publication."

It is quite possible that the Carolina Paroquet, from its exceedingly social nature, was compelled where very numerous to resort to open nesting sites from necessity, as suitable cavities are rarely found in sufficient quantities close to each other to accommodate any considerable number of pairs. We find this to be the case with *Bolborhynchus monachus* Boddärt, the Green Paroquet of Paraguay, Uruguay, and the Argentine Republic, which suspends its nests from the extremities of branches, to which they are firmly woven. Mr. Gibson describes their nests as follows: "New nests consist of only two chambers, the porch and the nest proper, and are inhabited by a single pair of birds. Successive nests are added until some of them come to weigh a quarter of a ton, and contain material enough to fill a large cart. Thorny twigs firmly interwoven form the only material, and there is no lining in the breeding chamber even in the breeding season. Some old forest trees have seven or eight of these huge structures suspended from the branches, while the ground underneath is covered with twigs and remains of fallen rocks."[1]

Another species the Patagonian Parrot, *Conurus patagonus* (Vieillot), found in the Argentine Republic, and in Patagonia, excavates its nest in perpendicular banks, like our Kingfisher; while the Ground Parrakeet, *Pezoporus formosus* Latham), of Australia nests in tall grass.

Although nearly all the species of this numerous family nest in hollow trees, as stated above, there are exceptions to this rule, and it is quite probable that some of our Carolina Paroquets nested at times in Florida as Judge R. L. Long described, and again both in communities in large hollow trees and singly, as Alexander Wilson states, all of these different assertions being probably correct.

We have no positive information about the number of eggs laid by this species in a wild state.

[1] Argentine Ornithology, Vol. II, 1889, pp. 43–46.

Dr. Karl Russ, of Berlin, Germany, in his interesting article on this species in his work on "Die Fremdländischen Stubenvögel, Die Papageien" (Vol. III, 1879, pp. 221–236), mentions several instances of the Carolina Paroquets breeding in captivity in Germany, where the eggs were deposited in June and July, two being the number laid; but in his "Handbuch für Vögelliebhaber," he gives the number from three to five, and he describes these as pure white, fine grained, very round, and quite glossy, like Woodpeckers' eggs, measuring 38 by 36 millimetres, or about 1.50 by 1.42 inches.

Mr. Robert Ridgway's birds would not use the nesting boxes provided for them, and both females deposited their eggs on the floor of the cage; they were laid in July, August, and September, respectively. None of these eggs can be called round; they vary from ovate to short ovate, and are rather pointed. They are white, with the faintest yellowish tint, ivory-like and quite glossy; the shell is rather thick, close grained, and deeply pitted, not unlike the eggs of the African Ostrich (*Struthio camelus*), but of course not as noticeable. Holding the egg in a strong light, the inside appears to be pale yellow.

These eggs measure 36.32 by 26.92, 34.54 by 27.18, and 33.27 by 26.92 millimetres, or 1.43 by 1.06, 1.36 by 1.07, and 1.31 by 1.06 inches.

The deep pitting is noticeable in every specimen, and there can be no possible doubt about the identity of these eggs. The other eggs in the collection about whose proper identification I am not so certain, and whose measurements I therefore do not give, have a much thinner shell, and do not show the peculiar pitting already referred to. There is no difficulty whatever in distinguishing these eggs from those of the Burrowing Owl or the Kingfisher, both of which are occasionally substituted for them.

The type specimen, No. 20784 (Pl. 1, Fig. 1), was laid in confinement on July 19, 1878, and is the smallest of the three eggs whose measurements are given above.

## Family CUCULIDÆ. The Cuckoos, Anis, etc.

### 2. Crotophaga ani Linnæus.

THE ANI.

*Crotophaga ani* Linnæus, Systema Naturæ, ed. 10, I, 1758, 105. Type *C. ani* Linnæus. (B 66.67, C 288, R 389, C 425, U (383).)

Geographical range: West India Islands and northern South America, east of the Andes; south to northern Argentina; casually north to the southern United States, Florida and Louisiana.

The Ani, also called Black Ani, Black Witch, Blackbird, Savanna Blackbird, and Tickbird, can only be considered as a straggler within the borders of the southern United States. It is a common resident species in the West India Islands and in northern South America east of the Andes Mountains, and reaches the southern limits of its range in northern Argentina. There are two

specimens in the United States National Museum collection, taken within the limits of the United States—one from the Dry Tortugas by Mr. J. Wurdeman, on June 24, 1857; the other by Mr. G. A. Boardman, from Charlotte Harbor, Florida.

A small flock of five of these birds was seen in July, 1893, at Diamond, Louisiana, opposite Point la Hache, and one of these was shot. This is now in the possession of Mr. George E. Beyer, who considers the Ani a regular summer resident in that locality.

The Ani is most commonly found at altitudes below 1,000 feet and rarely above 3,000. One of its principal call notes, according to Mr. John S. Northrop, who observed this species on Andros Island, one of the Bahamas, is "wee-eep," the second syllable uttered in a much higher key than the first; another common call sounds like "que-yu." When perched on trees they are said to sit very close together in rows, and being good-natured social birds, they are rarely seen alone.

The most complete account of the general habits of the Ani is that of Mr. Charles B. Taylor, Rae Town, Kingston, Jamaica, in "The Auk" (Vol. IX, 1892, pp. 369–371).

"The Ani appears to be abundant in all parts of the island. It is one of the commonest birds near Kingston, and in most open or sparsely wooded lands or in the vicinity of cultivated clearings little groups or companies may nearly always be seen. Blackbirds are invariably present wherever cattle are pastured. I can not recollect an instance in which I have noted a herd of cows at pasture without a flock of these birds appearing in company with them or in their immediate vicinity. This association is, doubtless, chiefly for the purpose of feeding on the ticks and other parasites on the animals, a good work largely shared by the Grackles (*Quiscalus crassirostris*). It is most interesting to watch a company of Blackbirds when thus engaged. Many are perched on the backs of the cattle (two or three sometimes on one cow); others are on the ground, hopping about fearlessly among the grazing herd, searching for insects at the roots of the herbage, or capturing those disturbed by the feet of the cattle. At this time one or more individuals are stationed on some tree close by, from which they now and again call to those in the open with that remarkable cry, variously syllabicated by some, but which I have at times thought strangely like the wailing of a young cat. Insects of all orders and their larvæ, ticks, grubs, etc., form their chief food. Occasionally, perhaps, a few small lizards are taken, and, I believe, the eggs of other birds, as I once found in the stomach of a female portions of an egg, apparently that of some small bird. Gosse records having seen these birds eating the ripe berries of the fiddle wood, but I have not noticed them at any time eating vegetable food.

"The Blackbirds at their best have a very lean and shabby appearance, and are slow and awkward in their movements. I have watched an individual make several ineffectual attempts to alight on the frond of a cocoanut palm; but even among the branches of other trees their actions appear awkward. Their flight

is slow and gliding, somewhat labored, and of little duration, the birds often appearing to fall short of the point originally aimed at. Yet they will chase the large yellow butterflies, and I was shown a large green locust that one of these birds was seen to capture in flight and afterwards drop. In the progress of a flock from place to place they do not usually fly all together, but move away in straggling groups or couples. One or more individuals first start off with their wailing call, followed soon after by two or three; after a little delay, then two more go; another pause, then one, then three, and so on. If a tree has very dense foliage, they alight (with much awkward scrambling) on the tops or extremities of the highest branches, where they may gain a clear and uninterrupted view, and this is usually the case when they are traversing very open country.

"Their nesting habits are exceedingly curious and interesting. Many individuals (possibly members of one flock) work together in the construction of a large nest, in which all the females of the company lay their eggs. The number of eggs deposited in different nests varies greatly, but is of course dependent on the number of birds in a company. Six and eight eggs are commonly found. I once took eleven, and in August, last year, I saw a clutch of twenty-one that had been taken from a single nest. It is probable that normally not more than two eggs are deposited by each bird, but nothing definite can be said on this point. The nest, which is usually placed high up in a tall tree, very frequently in a clump of mistletoe on a 'bastard cedar,' is a large, loosely constructed mass of twigs, entirely lined with dried leaves. But the most remarkable circumstance in connection with the nesting of these birds is the deposition of the eggs in regular layers, with leaves between. This custom I had long heard of before an opportunity offered for personal observation. In the first nest I examined the eggs were in two distinct layers, separated by a deep bed of dry leaves; the bottom layer consisted of four eggs, and these, strange to say, were all infertile. I believe this singular habit is practiced in all cases where a large number of birds resort to the same nest. The eggs are a deep bluish green, but when freshly laid are covered with a white, chalky coat, which soon becomes much scratched and erased on all. Now, what seems very singular is that comparatively little of this chalky covering gets rubbed off the sides, where, from the turning over of the eggs in the nest, we should expect to see the greatest extent of denudation, whereas one or both ends are nearly always wholly denuded. That this circumstance is not merely accidental I feel sure, as in a large series of clutches that I have examined more than two-thirds of the number of eggs show this peculiarity. So cleanly and evenly is it done, and to such an extent, that I feel confident that it is the work of the birds themselves, their beaks alone being able to accomplish it. At the same time it is easy to see that the marks and scratches at the sides are the result of friction with the twigs and leaves of the nest. Average measurements of the eggs are 1.33 by 1.20 inches. I have found eggs and young in February and throughout the succeeding months to August, two or three broods probably being reared. I have also seen young, fully fledged,

but unable to fly, hopping about the branches of the nesting tree; and on another occasion, some, more advanced, searching for insects in the grass at the roots of a large guango tree, in company with many old birds."

The eggs of the Ani are glaucous-blue in color, and this is overlaid and hidden by a thin, chalky, white deposit; as incubation advances the eggs become more or less scratched and the blue underneath is then plainly visible in places, giving them a very peculiar appearance. In shape they vary from oval to elliptical oval; the shell is fine grained, rather strong, and without luster.

The average measurement of forty eggs in the United States National Museum collection, mostly from the West Indies, is 34.66 by 26 millimetres, or about 1.36 by 1.02 inches. The largest egg of the series measures 39.62 by 26.67 millimetres, or 1.56 by 1.05 inches; the smallest, 29.21 by 23.37 millimetres, or 1.15 by 0.92 inches.

The type specimen, No. 6048 (Pl. 1, Fig. 6), from a nest containing seven eggs, was taken by Mr. W. T. March, near Spanish Town, Jamaica, on July 30. 1862.

### 3. Crotophaga sulcirostris Swainson.

GROOVE-BILLED ANI.

*Crotophaga sulcirostris* Swainson, Philosophical Magazine, I, 1827, 440.
(B —, C —, R 390, C 426, U 384.)

Geographical range: Along the western slopes of the Andes, in South America, to the Pacific coast; from Peru north through Central America on both coasts, and through Mexico to the lower Rio Grande Valley in Texas, and southern Lower California. Casual in the United States in southern Florida, southern Louisiana, southern Arizona, and California.

The breeding range of the Groove-billed Ani or Jewbird within the United States is a very limited one and appears to be confined to the Lower Rio Grande Valley in Texas, where it was first discovered near Lomita by Mr. George B. Sennett, on May 19, 1878, and added by him to our fauna. Since then it has been found breeding in small numbers in chaparral in the vicinity of Brownsville, and its nest and three sets of eggs were taken there and are now in the Ralph collection in the United States National Museum.

It straggles occasionally along the Gulf coast to southern Louisiana. Mr. E. A. McIlhenny shot one of these birds on Avery's Island on August 23, 1891, which is now in his collection, and it has also been taken in Florida. It is a common resident in suitable localities throughout the greater part of Mexico, the southern parts of Lower California, the whole of Central America, along both coasts, and those portions of South America situated on the western slopes of the Andes south to Peru. It is a bird of the lowlands, being rarely met with at altitudes over 700 feet, and it is generally resident wherever found.

Prof. A. L. Herrara, of the National Museum of the City of Mexico, has kindly furnished me with the following notes:

"*Crotophaga sulcirostris* is known to the inhabitants here as the *Pijon* and *Garrapatero*. It is a social bird, being usually found in small companies of from six to fifteen individuals, absolutely monogamous, sedentary, and of semidomesticated habits, frequenting the haciendas and the fields and pastures in their vicinity, and as it is considered very useful because of its habit of destroying large numbers of parasites infesting the cattle, it is not molested by the inhabitants, and becomes very tame. It extracts the *Ixodes* and other *Acaridans* with remarkable skill, without causing ulcerations which might result from the proboscis or sucker remaining in the fibers of the skin, and it must be regarded as one of the most useful birds of Mexico, especially of the warm regions, so abounding in parasites of all kinds. It is noteworthy that all the *Crotophagæ* I have collected were remarkably lean, which the natives assert is their normal condition; and without exception the *Garrapatero* is found in all the warmer parts of Mexico where there are cattle."

Mr. E. Kirby Smith, of Jataplan, Vera Cruz, Mexico, writes me that the Groove-billed Ani is locally known there as the *Chicuya*, usually inhabiting the thick chaparral and uttering, almost constantly, a peculiar cracking sound He has found their nests in brush thickets, usually not more than 6 feet from the ground—rather loose structures, resembling the nests of the Cardinal (*Cardinalis cardinalis*), but larger, and has observed as many as fifteen eggs in a nest.

Mr. Charles W. Richmond has kindly furnished me with the following notes on the general habits of this species as observed by him in the vicinity of Bluefields, Nicaragua:

"A very abundant resident. It appears to breed at various times during the year, as I have found fresh eggs July 6, 1892, and young birds, recently from the nest, November 29, the breeding season spreading over seven months of the year at least, as it begins nesting earlier than the date of taking my first eggs. Nests are frequently built in the heart of a thick, thorny orange or lemon tree, and this appears to be a favorite situation. In this case the nest is from 4 to 7 feet from the ground, and, besides being difficult to get at, is somewhat protected from invasion by the wasps which almost invariably take up their abode in the same tree. In going through a small lemon grove I found an old nest of this species. In the cavity there were no eggs, but on poking the nest to pieces six badly decayed eggs rolled out.

"One nest containing three eggs in the proper place and two others at the bottom, under the lining of green leaves, was located in a bamboo about 12 feet from the ground. The eggs were fresh, and more would probably have been deposited; the leaves forming the lining were still green. The parent birds were away at the time. Another nest was situated in some vines which had overrun an old tree stub, and was about 15 feet from the ground.

"It may be that where numerous eggs are deposited in one nest only those eggs that are deposited in the proper place and directly influenced by the incubating bird are hatched, while those placed among the sticks forming the

bulky exterior are left unhatched. It would be interesting to watch the progress of a large nestful of eggs and note results. The nests found by me were all composed of dead black twigs, rather loosely put together, very bulky and conspicuous structures, lined with green leaves, or, if old nests, with leaves that had the appearance of having been picked green. On one occasion I saw a bird, with nesting material in its bill, taking short flights from one bamboo to another, followed by several other birds composing the company, but none of these latter had nesting material with them.

"At Mr. Haymond's plantation, on the Escondido River, above Bluefields, this species was unusually plentiful, owing, no doubt, to a large number of cattle kept there. The birds follow these animals as they meander over the pastures, hopping along on each side of an animal, catching grasshoppers and other insects which the cow disturbs as it moves along. Frequently the cow moves too rapidly and the birds lag behind, when they make short flights to the front again, passing over one another after the manner of the Grackles when feeding in a field. Only half a dozen birds or so follow a cow usually, and not many congregate in one flock, except when roosting. On this plantation, where the species is more abundant than usual, the birds appear to roost in numbers. An orange tree near the house was a favorite place where thirty or forty birds came to pass the night, flying in from the surrounding pasture about dusk, and after a few short flights from one tree to another, passed into the roost one or two at a time, hopping about as if seeking a favorable perch, uttering their peculiar note meanwhile. Out of this roost I shot seventeen birds one evening, and the males greatly predominated; there were only five females in the lot. The note of this species reminds one somewhat of the Flicker, *Colaptes auratus*, but may be better represented by the combination 'plee-co,' rapidly repeated, with the accent usually on the first syllable, but sometimes on the last. I have frequently found one of the small flocks resting on a bush or bamboo along the water's edge, perfectly silent, until my near approach started them off, one or two at a time, scolding as they went. Their flight is even, slow, as short as possible, and consists of a few flaps of the wings, followed by a short sail, then a few more flaps, etc.

"The food of those examined by me on banana plantations consisted almost entirely of small grasshoppers, the stomachs being much distended with these insects. From the fresh earth found on the bill and feet of these birds, I should judge they also feed on the ground. The *Crotophaga* is gregarious all the year round."

The following observations on the nesting habits of this species, based on manuscript notes of Mr. Anastasio Alfaro, director of the National Museum of Costa Rica, at San Jose, and recently published by Mr. George K. Cherrie, are especially interesting.

"The *Zopilotillo* (so-pee-lo-tée-yo), also known as 'Tijo-tijo' (tee-ho), in imitation of its peculiar notes, which seem to repeat the word *tijo* over and over again, is very abundant in the fields near Tambor (a little town about 20 miles

northwest of San Jose), where, along the hedgerows and in the scrubby timber, as well as on the skin of the cattle, they find those insects which constitute their food. The woodticks, or garropatos, from the legs and about the head and neck of the cattle are esteemed above all else a favorite morsel. In this locality I have collected three nests during the month of May, the first with nine eggs, the second with eleven, and the last with thirteen. Some years ago I remember seeing a nest, situated in the branches of a mango tree, that contained fourteen eggs.

"The nests that I have collected agree with the observations made by Zeledon. The structure is voluminous, composed chiefly of coarse dead twigs, but presents one peculiarity not observed in any other bird, namely, the nest being lined with fresh green leaves. My three specimens were all placed in low trees, and neither was found at a greater height than 3 metres. One had been built above an old nest of one of the larger *Tyrannidæ*.

"It will not be without interest, I think, to insert my observations relative to one of these nests. On the 20th of May I noticed a *Zopilotillo* with a dry stick in his bill, which was immediately carried to a point in the hedgerow, where it was deposited with three others. After assuring myself that the bird was building its nest there, I retired, with the intention of returning at a more opportune moment. And when, one week later, I returned to the same spot, what was my surprise to see not only the nest completed and containing six eggs, but more than this—in the thorns and leaves about it were scattered seven more eggs! As a consequence, if that collection was not the work of the *Zopilotillos* collectively, the poor owner would have had to deposit three eggs daily. In the finding of some of the eggs scattered in the leaves was revealed one of the architect's peculiarities. A hole had been left in the center of the nest and only recently filled with leaves, whose fresh green color testified that they had been cut and placed there later than the others forming the carpeting to the bottom of this common incubator.

"The eggs were all fresh, the six occupying the nest having the characteristic rough, white, calcareous surface, perfectly clean, and without the slightest variation in color. Not so with the eggs found about the outside of the nest. Those found in contact with the leaves had taken on a dirty yellowish tinge. Those held suspended among the leaves and thorns showed various spots and lines of the lustrous blue color forming the base for the chalky external coat. The scratches had been caused by a too close contact with the thorns."[1]

There can no longer be any doubt that the general nesting habits of this species are similar to those of the Ani, and that frequently more than one female lays in the same nest, although this habit may not be so universal as with the preceding species.

The three sets of eggs from the Ralph collection, taken near Brownsville, Texas, contained, respectively, four, five, and five eggs; in two of these the eggs were fresh, and in the other incubation had just commenced when taken,

[1] The Auk, Vol. IX, 1892, pp. 325, 326.

on May 28, 1892. These sets appear to have been laid by one bird, the eggs in each set resembling each other very closely. They were placed in huisache trees (*Acacia farnesiana*), from 6 to 10 feet from the ground, in rather open woods.

A nest now before me, taken by Mr. Charles W. Richmond, near the Escondido River, Nicaragua, on July 6, 1892, containing three fresh eggs when found, is composed of small twigs of a vine, mixed with a few blades of cane leaves, and the center is filled with a layer of leaves of different species. It is a rather loose structure, about 10 inches in diameter and 4 inches in height. The inner cup measures 4 inches in diameter by 2½ inches in depth. Nothing definite is known about the time of incubation, nor whether the male assists in this duty; from three to five eggs seem to be laid by each female, and two or three broods are probably raised in a season.

The eggs are mostly oval in shape, but occasionally one is found that may be called elliptical ovate. They resemble those of the Ani very closely and the same description will answer for both, with the exception that the chalky matter covering the glaucous-blue ground color appears to be heavier in the present species, giving them a more uniform milky blue appearance, and that they are also considerably smaller.

The average measurement of forty eggs in the United States National Museum collection is 31.13 by 23.93 millimetres, or about 1.23 by 0.94 inches. The largest egg of the series measures 33.53 by 25.15 millimetres, or 1.32 by 0.99 inches; the smallest, 27.68 by 21.84 millimetres, or 1.09 by 0.86 inches.

The type specimen, No. 18565 (Pl. 1, Fig. 7), from a set of five eggs, was taken by Mr. L. Belding, near San Jose del Carbo, Lower California, on April 29, 1882, and represents an unscratched specimen.

## 4. Geococcyx californianus (Lesson).

ROAD-RUNNER.

*Saurothera californiana* Lesson, Complement des Œuvres de Buffon VI, 1829 (?), 420.
*Geococcyx californianus* Baird, Birds of North America, 1858, 73.
(B 68, C 289, R 385, C 427, U 385.)

Geographical range: Central and northern Mexico and adjoining portions of the United States; east through the western half of Texas, and extreme western Indian Territory; north to southwestern Kansas, southern Colorado, southern Utah, southern Nevada, and southwestern Oregon (?); Lower California.

The Road-runner, equally well known as the "Chaparral Cock," and occasionally called "Snake-killer," "Ground Cuckoo," "Lizard Bird," and by the Spanish-speaking population of our southern border "*Paisano*" and "*Correcamino*," is generally a resident and breeds wherever found, excepting perhaps in the extreme northern portions of its range. This it reaches in Shasta County, California, on the western slopes of the Sierra Nevada, in about latitude 40° N., while on the east side of these mountains it has as yet not been observed north

of Inyo County, California, about latitude 36° N. In southwestern Kansas it is undoubtedly quite rare and can only be considered as a straggler.[1]

Its general habits are far more terrestrial than arboreal, spending most of its time on the ground in search of food, and frequenting the drier desert tracts adjacent to river valleys, and the lower foothills, covered by cactus, yuccas, and thorny undergrowth. It rarely ventures into the higher mountain ranges among the conifers, but breeds occasionally among the oaks bordering the pine belt. It is most abundant at altitudes ranging from 2,000 to 3,500 feet, and is seldom seen within the United States above 5,000 feet; but in the San Pedro Martir range, in Lower California, Mr. A. W. Anthony has met with the Road-runner at an altitude of 7,000 feet above sea level, and at Glorietta, New Mexico, it has recently been reported as breeding at a height of 8,000 feet.

The Chaparral Cock is rather unsocial in its habits, and it is rare to see more than a couple together excepting after the breeding season, when the young still follow one of the parents. Its food consists almost entirely of animal matter, such as grasshoppers, beetles, lizards, small snakes, land snails, the smaller rodents, and not unfrequently of young birds. On the whole, these birds do far more good than harm. When the fig-like fruit of the giant cactus is ripe they also feed on this; in fact, many mammals and birds seem to be very partial to it. It is astonishing how large an animal can be swallowed by one of these birds. I have found a species of garter snake fully 20 inches long in the crop of one shot in Arizona.

Mr. Anthony writes me on this subject as follows: "A half-grown bird which I shot at San Quentin, Lower California, presented an unusually bunchy appearance about the throat and neck, a fullness which was accounted for upon dissection by the discovery of an immense lizard which had been swallowed entire but a few moments before the bird was shot. I know of several instances of Road-runners making a meal of a nest of young House-finches, *Carpodacus mexicanus frontalis*, and other small birds."

I am aware that there is a pretty general belief in localities where the Road-runner is common, and where the rattlesnake is usually more so, that these birds are more than a match for even the largest of these reptiles, and attack and kill them wherever found, an assertion I very much question. It is said when one of these birds, while rambling about, meets a rattlesnake, coiled up and asleep after a good meal, it quietly hedges the reptile in with a ring or fence of the joints of the *Cholla cactus*, and after having done so, drops a similar joint from above on the sleeping reptile, which, being enraged thereby, thrashes around and soon becomes covered with the sharp spines, and then falls an easy victim to the bird, after becoming exhausted in vain attempts to free itself. The bird is said to first pick its eyes out and so render it entirely helpless. This is a very plausible story, and while I am only too well aware of the sharpness of the spines of the *Cholla*

[1] In a letter received from Mr. A. W. Anthony, written on August 5, 1888, and overlooked by me when this article was written, he informs me that a Road-runner, accompanied by three young, was seen by a traveling companion of his who knew these birds well, on the line of railroad between Albany and Ashland, Oregon, about 50 miles south of Albany, some time in August, 1887. This extends its range considerably northward.

*cactus*, I know that such a hedge proves no barrier to these snakes, and that they do not mind such obstructions in the least, passing over without touching them. I consider this story on a par with the generally accepted belief of hunters and frontiersmen in the West, that rattlesnakes will not cross over horsehair ropes, when laid around one's bed while camping out. I admit having heard this frequently from persons I had no reason to doubt, that I was a firm believer in the statement, and made use of this snake protector for a number of years; but at last my faith was rudely shattered by seeing a medium-sized rattlesnake deliberately crawling over such a rope which I had stretched around my tent. The snake paid no attention to the hair rope, but slightly curved its body where about to come in contact with it, gliding over without touching it, and, finding a sunny spot at the side of the tent, coiled up to take a rest, part of its body lying directly on the rope. Since witnessing this performance I have naturally lost faith in this belief, and have wished many times since that it had not been so rudely shaken, especially when in sections of the country where these reptiles are abundant and where one is liable to find his blankets occupied by one or more rattlers.

Road-runners are ordinarily rather shy and suspicious birds, and not as often seen as one would think, even where comparatively common. Within the United States they are most abundant along the southern borders of Texas and Arizona, and in southern California. I found them quite common in the vicinity of my camp on Rillito Creek, near Tucson, Arizona, and also near Anaheim, Orange County, California, and I have examined about twenty of their nests. Notwithstanding their natural shyness, they are inquisitive birds, and where they are not constantly chased and molested will soon become used to man. One of these birds paid frequent visits to my camp, often perching on a mesquite stump for half an hour at a time, within 20 yards of my tent. While so perched it would usually keep up a continuous cooing, not unlike that of the Mourning Dove, varied now and then by a cackle resembling that of a domestic hen when calling her brood's attention to some choice morsel of food. This call sounded like "dack, dack, dack," a number of times repeated. Another peculiar sound was sometimes produced by snapping its mandibles rapidly together. While uttering these notes its long tail was almost constantly in motion and partly expanded, and its short wings slightly drooped. In walking about at ease, the tail is somewhat raised and the neck partly contracted. When suddenly alarmed the feathers of the body are compressed and it trusts almost entirely to its legs for escape, running surprisingly fast. While running it can readily keep out of the way of a horse on a fair gallop on comparatively open ground, and should the pursuer gain too much on the bird, it suddenly doubles on its course and takes advantage of any thickets or broken ground in the vicinity, and is soon lost to sight. Its flight is apparently easy and, considering its short wings, is rather swift.

In southern Arizona the breeding season begins sometimes as early as the middle of March, but the majority of the birds there, as well as throughout the balance of their range, do not commence nesting before April, and nidifi-

cation lasts through the summer months, two and occasionally three broods being raised in a season. While the first set of eggs laid by such species as rear more than one brood in a season is usually larger in number than subsequent ones, it seems to me that with the Road-runner the reverse is the case.

During the month of April, 1872, I found several nests, none of which contained more than three eggs, all well incubated when found; similar small sets were found during the first half of May, while in June and July the sets numbered from four to six eggs, the latter the largest sets observed by me in Arizona. The following explanation may account for this:

In southern Arizona, during the spring months, insects and reptiles, which form the bulk of the food of these birds, are rather scarce, while in June, as soon as the rains commence, and later through the summer, suitable food is far more abundant and a larger family can be much more readily cared for, and I am of the opinion that these birds know this and act accordingly. Occasionally a larger number of eggs is found, however, and Lieut. H. C. Benson, Fourth Cavalry, United States Army, writes me that he saw a nest of this species, near Fort Huachuca, containing six young birds, all of different sizes, and two eggs; the largest of the young was about ready to leave the nest, and the smallest only a day or two old.

Their nesting sites are quite variable. In southern Arizona the majority of nests found by me were placed in low mesquite trees or thick bushes, and in different species of cacti, such as the prickly pear, cholla, and others. Occasionally one of their nests is placed on top of a mesquite stump, surrounded by green sprouts, or in a hackberry or barberry bush. I found one nest in a palo verde tree, and another in a willow thicket; in the latter case the birds did not build their own nest, but appropriated one of the Crissal Thrasher, *Harporhynchus crissalis*. Mr. F. H. Fowler writes me from Fort Bowie that he saw a nest near there, placed in the hollow of a dead stump.

In Texas the Roadrunner sometimes nests in ebony bushes, and in California it has been known to use the nest of the California Jay, *Aphelocoma californica*, in oak trees, sometimes fully 16 feet from the ground. Usually the nests are placed from 3 to 8 feet from the ground, and only in rare instances higher. Sometimes they are found in quite open situations, but generally they are well concealed from view.

A typical nest of the Road-runner may be described as a rather flat and shallow but compactly built structure, about 12 inches in diameter and varying in thickness from 4 to 6 inches, with but little depression interiorly. The ground work consists of sticks from 5 to 10 inches long, lined more or less regularly with finer material of the same kind and finished off with dry grasses. Occasionally bits of dry cow or horse dung, a few feathers, the inner bark of the cottonwood, dry mesquite seed pods, bits of snake skin, and small grass roots are used, and now and then no lining is found, the eggs lying on a simple platform of twigs.

The number of eggs to a set varies in different localities from two to nine, and occasionally as many as twelve have been found in a nest, possibly the

product of two birds. Sets ranging from four to six eggs are the rule. In large sets several sterile eggs are nearly always found, and I believe that rarely more than five young are hatched at one time. Incubation begins sometimes with the first two eggs laid, especially when the set is to be a large one, and again I have taken apparently full sets of four eggs in which there was no perceptible difference in the size of the embryos. Occasionally an egg is deposited daily, usually only every other day, and sometimes the intervals are still greater. Incubation lasts about eighteen days, and both sexes assist in this labor.

The parents are devoted to their young, and when incubation is well advanced the bird will sometimes allow itself to be caught on the nest rather than abandon its eggs. The nestlings, when disturbed, make a clicking noise with their bills. When taken young, they are readily tamed, soon becoming attached to their captor, showing a great deal of sagacity, and making amusing and interesting pets.

The eggs of the Road-runner are white in color and unspotted, mostly ovate and short ovate, and rarely elliptical ovate in shape. The shell consists of two layers, the lower one close and fine grained, always pure white, without gloss; the upper, a mere film similar to that covering the ground color of the Anis, but more firm and not so easily scratched or rubbed off. This overlaying film gives these eggs sometimes a very pale yellow tint and a moderately glossy appearance.

The average measurement of one hundred and one eggs in the United States National Museum collection is 39.12 by 29.97 millimetres, or 1.54 by 1.18 inches. The largest egg of the series measures 44.45 by 29.97 millimetres, or 1.75 by 1.18 inches; the smallest, 36.07 by 28.19 millimetres, or 1.42 by 1.11 inches.

The type specimen, No. 20464 (Pl. 1, Fig. 2), from a set of four eggs, Bendire collection, was taken by the writer near Tucson, Arizona, on June 18, 1872, and represents an averaged-sized egg of this species.

## 5. Coccyzus minor (Gmelin).

MANGROVE CUCKOO.

*Cuculus minor* Gmelin, Systema Naturæ, I, i, 1788, 411.
*Coccyzus minor* Cabanis, Journal für Ornithologie, 1856, 104.
(B 71, C 292, R 386, C 429, U 386.)

Geographical range: The West India Islands, excepting the Bahamas; the coast regions of northern South America from Guiana to Colombia, thence north through Central America on both coasts; on the Pacific, to the Isthmus of Tehuantepec; on the Gulf coast to Tampico, Mexico, and probably still farther north; in the United States to the coast of Louisiana, and in southern Florida, on the west side mainly, north to about latitude 27° 30′.

The breeding range of the Mangrove, also known as the "Black-eared" Cuckoo, and on the Island of Jamaica as the "Young Old-man Bird," is, in the United States, as far as known, a very restricted one, being mainly confined

to the Keys, and the west coast of southern Florida, north to about latitude 27°, and to the Gulf coast of Louisiana. In Florida it appears to be rather rare, while in southern Louisiana it is reported as somewhat more common.

Audubon first met with this species on Key West and states that its habits are much the same as those of the better known Yellow and Black-billed Cuckoos. It seems to be found only in the immediate vicinity of the coast, among the mangroves, live oaks, and dense shrubbery usually found growing in such localities. Mr. E. A. McIlhenny writes me: "The Mangrove Cuckoo is not an uncommon summer visitor on the coast of southern Louisiana, where it usually arrives about March 15 and leaves in September. Here it frequents the live-oak timber near streams or swamps, and usually nests on horizontal branches of wax myrtle, from 4 to 12 feet from the ground.

"The earliest date on which I have taken a nest was on April 17, 1891; this contained three eggs. On July 27, 1892, I took a set of four eggs, and I believe that two broods are raised in a season. Both of these nests were placed in wax myrtles, and were almost flat and rather poorly constructed platforms, composed of dry twigs of the wax myrtle, no lining, and with barely any depression in the center. I am inclined to believe that the Mangrove Cuckoo is more common now than formerly, and also less shy. It does not begin to incubate until the full set of eggs has been deposited. When disturbed on the nest the female almost always shows fight; that is, she will raise her feathers, spread her tail, and fly at you very much as a hen would when guarding her young, and at the same time she utters a clucking sound which resembles that of a domestic hen very closely. Its food consists of locusts, grasshoppers, etc."

Audubon states that it is fond of sucking the eggs of all kinds of birds in the absence of their owners, and that it also feeds on fruits and various kinds of insects.

There are no fully identified eggs of this species in the United States National Museum taken within our borders, but a number collected by Mr. W. S. March, near Spanish Town, Jamaica, in May, 1862, are unquestionably referable to this Cuckoo. They are pale glaucous green in color, and vary in shape from blunt ovate to nearly a perfect oval. The shell is close grained, rather thin, and without gloss. The egg resembles that of the better known Yellow-billed Cuckoo very closely, but averages a trifle larger.

The average measurement of twelve eggs from Jamaica is 30.88 by 23.45 millimetres, or about 1.21 by 0.92 inches. The largest egg measures 32.51 by 24.64 millimetres, or 1.28 by 0.97 inches; the smallest, 29.72 by 21.59 millimetres, or 1.17 by 0.85 inches.

The type specimen, No. 6052 (not figured), from a set of six eggs, was taken by Mr. W. S. March, referred to above, near Spanish Town, Jamaica, in May, 1862.

## 6. Coccyzus minor maynardi Ridgway.

MAYNARD'S CUCKOO.

*Coccyzus maynardi* Ridgway, Manual North American Birds, 1887, 274.
*Coccyzus minor maynardi* Allen, Ms.
(B 71 part, C 292 part, R 386 part, C 429 part, U 386*a*.)

Geographical range: Bahama Islands and southern Florida; Cuba?.

Within the United States the range of Maynard's Cuckoo, a somewhat smaller and paler race than the preceding, and from which it has been separated within the last decade, is a still more restricted one, and it has so far only been found at Key West, where it is rather rare, but it is thought to breed there in limited numbers. It is likely to occur also in suitable localities at points along the east coast of Florida, north to about latitude 27° and possibly still farther. It is evidently only a summer visitor to our shores, retiring south again in winter. It is said to be common throughout the Bahamas, and Mr. J. S. Northrop, on a recent visit to Andros Island, in the spring of 1890, obtained several specimens of this Cuckoo there and saw others. Their notes were frequently heard by him in the mangroves or near by. The stomachs contained the remains of small insects and grasshoppers.

Their general habits, mode of nidification, and eggs doubtless resemble those of the Yellow and Black-billed Cuckoos very closely. There are no positively identified eggs of Maynard's Cuckoo in the United States National Museum collection, but they are not likely to differ any in color or much in size from those of the preceding species.

## 7. Coccyzus americanus (Linnæus).

YELLOW-BILLED CUCKOO.

*Cuculus americanus* Linnæus, Systema Naturæ, ed. 10, I, 1758, III.
*Coccyzus americanus* Bonaparte, Journal Academy Natural Sciences, Phila., III, ii, 1824, 367.
(B 69, C 291, R 387, C 429, U 387.)

Geographical range: Eastern North America; north in the Dominion of Canada to Nova Scotia, southern New Brunswick, southern Quebec, and Ontario to about latitude 45° 30′. In the United States, through southern Maine, Michigan, Wisconsin, southern Minnesota, and South Dakota; west to Nebraska, Kansas, the Indian Territory, and Texas; south to Florida, the Gulf coast, and the West India Islands; in winter to eastern Mexico, and Costa Rica, Central America. Casual to eastern Colorado, Wyoming, and North Dakota. Accidental in Greenland, Great Britain, and Belgium.

The breeding range of the Yellow-billed Cuckoo, also known as "Rain Crow" or "Rain Dove," "Kow-Kow," "Wood Pigeon," "Indian Hen," and in some of the West India Islands as "May Bird," is coextensive with its geographical distribution in the United States and the southern portions of the

Dominion of Canada; and it also breeds on a number of the West India Islands, but in the Lower Rio Grande Valley and in the extreme western parts of Texas it is replaced by the California Cuckoo during this time. It is a moderately common bird in suitable localities throughout the greater part of its range in the United States, excepting along our northern border, but on account of its shy and retiring ways it is much more frequently heard than seen; it is only a summer visitor throughout the greater portions of its range in the United States, excepting Florida and parts of the Gulf coast, where some of these birds are known to winter, but by far the greater number retire still farther south to the West India Islands, and others through eastern Mexico, as far as Costa Rica. The Yellow-billed Cuckoo usually arrives in the Northern States about the commencement of May, and remains there until the end of September or the early part of October. It is decidedly arboreal in its habits, and is rarely seen on the ground, where, on account of its short and weak feet, its movements are rather awkward; but on the wing it is exceedingly graceful; its flight is noiseless and swift, and it moves or rather glides through the densest foliage with the greatest ease, now flying sidewise, and again twisting and doubling at right angles through the thickest shrubbery almost as easily as if passing through unobstructed space, its long tail assisting it very materially in all its complicated movements. Few of our birds show to better advantage on the wing than the Yellow-billed Cuckoo. It rarely indulges in protracted flights on its breeding grounds, but keeps mostly in the shadiest trees, in dense thickets along water courses, or on small islands, shrubbery bordering country roads, the outskirts of forests, and were it not for its peculiar call notes, which draw attention to its whereabouts at once, it would be much less frequently seen than it usually is, even where fairly common; on the whole, it must be considered as a rather shy, retiring, and suspicious bird.

Its call notes are much more varied than is generally supposed, but it is impossible to positively distinguish them from those of its somewhat smaller relative, the Black-billed Cuckoo, which is likewise found throughout a considerable portion of its range, and it is extremely difficult to indicate these notes on paper. On the whole, I consider those of the Yellow-billed Cuckoo to be the louder of the two, but this is only a matter of opinion, and it is rather difficult to state just what difference exists between them. One of their commonest notes is a low "noo-coo-coo-coo;" another sounds more like "cow-cow-cow" or "kow-kow-kow," several times repeated; others resemble the syllables of "ough, ough, ough," slowly and softly uttered; some remind me of the "kloop-kloop" of the Bittern; occasionally a note something like the "kiuh-kiuh-kiuh" of the Flicker is also uttered; a low, sharp "tou-wity-whit" and "hweet hwee" is also heard during the nesting season. Though ordinarily not what might be called a social bird, I have sometimes during the mating season seen as many as eight in the same tree, and on such occasions they indulge in quite a number of calls, and if the listener can only keep still long enough he has an excellent opportunity to hear a regular Cuckoo concert.

From an economic point of view there are few birds which do more good than the Yellow-billed Cuckoos, as they live almost entirely on caterpillars, and even the hairy and sharp-spined ones are eaten by them in large numbers. Among the most important ones so destroyed are the cankerworm, the tent caterpillar (*Clisiocampa americana*), and that of *Vanessa antiopa*, as well as of numerous other butterflies, grasshoppers, beetles, cicadas, small snails, etc., and different kinds of fruit, as berries, mulberries, grapes, and others. Mr. J. L. Davison, of Lockport, New York, has also observed it catching winged ants, like a Flycatcher. I am aware that this species has been accused of destroying the eggs and even of eating the young of smaller birds, but I am strongly inclined to believe that this accusation is unjust, and in my opinion requires more substantial confirmation. I have never yet had any reason to suspect their robbing smaller birds' nests, and the very fact that they live in apparent harmony with such neighbors, who do not protest against their presence, as they are in the habit of doing should a Blue Jay, Grackle, or Crow come too close to their nests, seems to confirm this view. I am upheld in this opinion by a number of careful observers whom I have questioned on this important subject. Only two of my correspondents seem to be inclined to believe this charge to be well founded. Mr. William Brewster, of Cambridge, Massachusetts, writing me on this subject, says: "While I have never seen either of our Cuckoos destroy the eggs of other birds, nevertheless I think they do it occasionally. One of my reasons for this belief is that many of our smaller birds, Warblers, Sparrows, etc., show great anxiety whenever the Cuckoos approach their nests, and they pursue and peck at them when they take wing, behaving toward them, in fact, exactly as they do toward the Crows, Jays, and Grackles, which we *know* eat eggs whenever they can get a chance. My other reason is that one of my friends once shot a Cuckoo (*C. americanus*, I think it was) whose bill was smeared all over with the fresh yolk of an egg." Mr. H. P. Attwater, of San Antonio, Texas, although he has not observed it personally either, informs me that in his neighborhood this bird is locally known to the boy collectors as the Egg-sucker, and that some claim to have observed it in the act of stealing eggs.

Should an occasional pair of these birds, however, be guilty of such reprehensible conduct, which I am not yet prepared to admit, it by no means follows that it is a common practice. All of our Cuckoos deserve the utmost protection; it is simply astonishing how quickly a pair of these birds will exterminate the thousands of caterpillars infesting orchard and other trees in certain seasons; it makes no difference how hairy and spiny these may be, none are rejected by them, although no other birds will touch them, and the walls of their stomachs are sometimes completely pierced by the sharp, stiletto-like hairs, without injury, and apparently not incommoding these birds in the least. Their benefit to the horticulturist is immense, and he has certainly no better friends among our birds.

Although the Yellow-billed Cuckoo generally arrives in our Northern States about the middle of May, and occasionally a week or so earlier, it usually nests

rather late, and oftener, I believe, in the first week in July than in June. Like most birds, they are more noisy during mating time than at other seasons, and they are most often heard during damp, cloudy weather or before a storm, and on this account they are often called "Rain Crows," their continuous calls being supposed to presage wet weather.

As a rule they are shy and silent, unobtrusive birds, their plain, grayish-brown upper parts, with a faint bronze luster, harmonizing so perfectly with their surroundings that they are readily overlooked in the dense foliage and tangled undergrowth which they usually frequent, and it is no easy matter to study them closely, though occasionally a pair will select its nesting site close to human habitations and even in cities, when they lose their natural shyness to some extent.

Mr. Mark L. C. Wilde, of Camden, New Jersey, writes me: "On June 22, 1893, while passing the corner of Sixth and Market streets, I was surprised to see a Yellow-billed Cuckoo fly off her nest, which was built on the limb of a maple tree that hung over Market street, on which the electric cars run every ten or fifteen minutes. The nest contained two fresh eggs. There are no woods nor open fields within a mile or so of the tree in which the nest was built, although there are a number of shade trees around the city and plenty of caterpillars for them to feed upon."

In the southern portions of their range, including Florida and the Gulf States, nidification begins occasionally early in April, and fresh eggs may be found sometimes in the last two weeks of this month; but the majority of these birds rarely commence laying here before the second week in May. In the District of Columbia a few pairs nest in the latter part of this month, but the greater portion do not before June, and occasionally not before July, while instances of fresh eggs, possibly second layings, have been found in the latter part of August and even in the beginning of September. In the northern portions of its range the breeding season is at its height during the latter part of June and the first week of July, and here one brood only is raised, while in the south they sometimes raise two.

Mr. O. Widmann, of Old Orchard, Missouri, has kindly sent me the following notes on this species: "The Yellow-billed Cuckoos begin to lay here May 15. If the eggs are taken and none left in the nest, the birds abandon it and build another; but I do not think that two broods are raised in a season. This species begins to arrive here in the last days of April, but to get the earliest dates one must be up at 2 a. m., when their call is heard from time to time. After daybreak they are seldom heard before the first days of May, regularly only after the 5th. I found them very numerous in the St. Francis region the second week in May, where they were among the most conspicuous birds. At that time they seemed to live mostly on a large kind of May or willow fly (*Ephemera*), which the male bird caught and brought to his mate, who kept quietly perched and apparently awaiting his attentions. He alighted gracefully on her back and presented complaisantly the choice morsel, which was received with half-turned head and

open bill—the whole a picture of love and devotion pleasant to witness, and not marred by any unesthetic act or motion. One of the favorite foods of the Cuckoo in September is the elderberry, and the last week of this month may be set down as the time for its final departure."

The Yellow-billed Cuckoo is one of the poorest nest builders known to me, and undoubtedly the slovenly manner in which it constructs its nest causes the contents of many to be accidentally destroyed, and this probably accounts to some extent for the many apparent irregularities in their nesting habits. The nests are shallow, frail platforms, composed of small rootlets, sticks, or twigs, few of these being over 4 or 5 inches in length, and among them a few dry leaves and bits of mosses; rags, etc., are occasionally mixed in, and the surface is lined with dry blossoms of the horse-chestnut and other flowering plants, the male aments or catkins of oaks, willows, etc., tufts of grasses, pine and spruce needles, and mosses of different kinds. These materials are loosely placed on the top of the little platform, which is frequently so small that the extremities of the bird project on both sides, and there is scarcely any depression to keep the eggs from rolling out even in only a moderate windstorm, unless one of the parents sits on the nest, and it is therefore not a rare occurrence to find broken eggs lying under the trees or bushes in which the nests are placed. Some of these are so slightly built that the eggs can be readily seen through the bottom. An average nest measures about 5 inches in outer diameter by 1½ inches in depth. They are rarely placed over 20 feet from the ground, generally from 4 to 8 feet upon horizontal limbs of oak, beech, gum, dogwood, hawthorn, mulberry, pine, cedar, fir, apple, orange, fig, and other trees. Thick bushes particularly such as are overrun with wild grape and other vines, as well as hedgerows, especially those of osage orange, are also frequently selected for nesting sites. The nests are ordinarily well concealed by the overhanging and surrounding foliage, and while usually shy and timid at other times, the Yellow-billed Cuckoo is generally courageous and bold in the defense of its chosen home; the bird on the nest not unfrequently will raise its feathers at right angles from the body and occasionally even fly at the intruder.

The number of eggs in a set varies from two to five; sets of three are most common, while those of four are not at all rare. Now and then as many as six and seven have been found in one nest, but it is always more or less questionable if such large sets are the product of the same female. Usually an egg is deposited daily, and as a rule incubation does not commence until the set is completed; but there are also exceptions, and the bird may commence incubation when the first egg is laid, and at the same time continue laying at irregular intervals, varying from two to eight days, so that one will occasionally find birds of different ages and eggs in various stages of incubation in the nest. I must confess that no such instances have come under my own observation, but this fact has been so well established that there can be no question of it. It is also well known that this species will occasionally deposit an egg or two in the nests of the Black-billed Cuckoo, and the latter returns the compliment, and

now and then one of their eggs has been found in the nests of other species, such as the Wood-thrush, Robin, Catbird, Cedar-bird, Black-throated Sparrow, Cardinal, and Mourning Dove. Such instances appear to be much rarer, however, than those in which they interlay with each other, and the majority of these may well be due to accident, their own nest having possibly been capsized, and necessity compelled the bird to deposit its egg elsewhere. Such instances do occur at times with species that can not possibly be charged with parasitic tendencies.

There is a set of four eggs of the Meadow Lark (Ralph collection) before me now, taken on May 6, 1892, in Volusia County, Florida, which in addition contained an egg of the Florida Quail; another set of four eggs of the Gray-tailed Cardinal, taken by Mr. H. P. Attwater, near Rockport, Texas, on April 28, 1893, and presented to the collection here, contains also an egg of the Scissor-tailed Flycatcher, and I might cite other instances if I deemed it necessary.

It is indisputable, however, that some latent traces of parasitism exist in our Cuckoos, but these are not very frequent and seem to be principally confined among themselves, and are apparently more prevalent among the Black-billed species than the present one. Mr. Robert Ridgway tells me that he found both species nesting in an apple orchard, near Mount Carmel, Illinois, in June, 1864, in adjoining trees, the two nests being not over 10 feet apart.

Incubation, I think, lasts about fourteen days, and I believe the female performs the greater portion of this duty. The young when first hatched are repulsive, black, and greasy-looking creatures, nearly naked, and the sprouting quills only add to their general ugliness. If the eggs are handled the bird frequently forsakes the nest, either throwing them out or abandoning them. The eggs are elliptical oval in shape, about equally obtuse at either end; the shell is close grained, rather thin, and without gloss. The ground color varies from a uniform Nile blue to pale greenish blue when fresh, fading out in time to a pale greenish yellow. They are unspotted, but occasionally one or two eggs in a set present a sort of mottled appearance, the ground varying somewhat on different parts of the shell. Their color is one of those subtle tints which it is difficult to describe accurately. Many of the eggs resemble in tint some of the lighter-colored Heron's eggs.

The average measurement of sixty-six specimens in the United States National Museum collection is 30.28 by 22.94 millimetres, or about 1.19 by 0.90 inches. The largest egg in the series measures 33.53 by 25.40 millimetres, or 1.32 by 1.00 inches; the smallest, 27.94 by 21.34 millimetres, or 1.10 by 0.84 inches.

The type specimen, No. 25977 (Pl. 5, Fig. 1), from a set of three eggs, was taken by Mr. D. B. Burrows, near Lacon, Marshall County, Illinois, on July 5, 1893, and presents the mottled appearance previously referred to.

## 8. Coccyzus americanus occidentalis Ridgway.

CALIFORNIA CUCKOO.

*Coccyzus americanus occidentalis* Ridgway, Manual North American Birds, 1887, 273. (B —, C —, R 387 part, C 429 part, U 387*a*.)

Geographical range: Western North America; north to the southern portions of British Columbia; east to the Rocky Mountains and southern Texas; south over the table-lands of Mexico; northern Lower California.

The breeding range of the California Cuckoo, for which the name "Western Yellow-billed Cuckoo" seems to be more appropriate, is coextensive with its distribution in the United States. As far as yet known it reaches the northern limits of its breeding range about latitude 50° 45′, near Kamloops, in British Columbia, and its southern and eastern limits in the lower Rio Grande Valley, in southern Texas. The eastern slopes of the Rocky Mountains appear to form the eastern limits of its range in this direction. Although nowhere common, it seems to be generally distributed over the Pacific Coast States and Territories.

Mr. F. Stephens writes me: "I consider the California Cuckoo a rare summer resident of the valleys of southern California. The only instance of its breeding here, that I know of, was in the San Bernardino Valley; I saw the parent fly from the nest, which was in a slender willow growing in a thicket in a moist location. The little tree leaned, but was too strong to admit of my pulling the nest within reach; I therefore attempted to climb to the nest and succeeded in spilling the eggs, which broke on striking the ground. The fragments were pale green. The eggs were fresh and appeared to be two in number. I think the date was the latter part of May, 1882."

Mr. Charles A. Allen, of Nicasio, has found this subspecies breeding in the willow thickets along the Sacramento River, California, where it appears to be not uncommon in suitable localities. Dr. Clinton T. Cooke considers it moderately common in the vicinity of Salem, Oregon, and Mr. R. H. Lawrence met with it occasionally in the Columbia River Valley, in Clarke County, Washington. It appears to reach the center of its abundance, the lower Rio Grande Valley, in Texas, about the beginning of April, and sometimes nests there in the latter part of this month, but ordinarily not before May, while in southern Arizona it appears to arrive considerably later. I noticed it first on June 10, 1872, among the willows in the Rillito Creek bottom, and again on the 19th, but failed to find a nest before July 17, but after this date I found several others; two of these as late as August 22. Its general habits, call notes, and food are very similar to those of its somewhat smaller eastern relative, and excepting this difference and its stouter and larger beak, it is otherwise indistinguishable. On the whole, it appears to be more common west of the Sierra Nevada and the Cascade Mountains than in the interior, where I only met with it on a single occasion, near Old Fort Boise, at Keeneys Ferry, on the Oregon side of Snake River, and here I found a nest of this subspecies on August 2, 1876, containing

three half-grown young. The nest was placed in a clump of willows, within a few feet of where I was camped, and my attention was first attracted to it by the uneasy manner in which the parents moved through the willows, constantly flitting back and forth, and always with a large black cricket (*Anabus simplex* or *purpuratus*) in their bills, on which they seemed to feed their young entirely. They picked most of these repulsive-looking creatures from grass stalks and low shrubs on which they were feeding, and although there were numbers of them to be found all around, as well as in camp, they generally went off some little distance to get them. The nestlings, only two or three days old, were ugly-looking creatures, and their bodies were almost naked. The parents soon lost their fear caused by my proximity, and flew back and forth at short intervals during the three hours of daylight in which I had an opportunity to observe them. The young uttered occasionally a low, wheezy note, like "ugh, ugh," but on the whole both parents and young were rather silent. This subspecies has also been met with in Utah, and Mr. A. W. Anthony observed a Cuckoo which is unquestionably referable to this subspecies near Ensenada, Lower California. If the California Cuckoo showed the same parasitic habit of occasionally depositing one or more of its eggs in the nests of other birds, as its eastern relatives are now and then known to do, I believe that I should have observed the fact in southern Arizona. Here I found eight of their nests with eggs, and fully five hundred nests of smaller birds, which nested in similar localities among the willow thickets and mesquite bushes, overrun with vines, in the creek bottoms, but not a single instance of parasitism came under my observation. The California Cuckoo built its own nest in every case, and while it generally was a loose, slovenly affair, without any pretence to architectural beauty, I think on the whole it compared favorably with the nests of our two better-known eastern species; some at least were fairly well lined with dry grasses and the blossoms of a species of *Evax*, and there was generally a slight depression in the center of the nest for the eggs to rest in. I took my first set, containing two fresh eggs, on July 17, 1872; on the 25th of this month I found another set of four eggs in which incubation had slightly and uniformly begun. On July 27 I secured two more sets, one of four, the other of three eggs, both fresh; and I did not find any more until August 21, when I took a set of three, one of which contained a large embryo, another one somewhat less advanced, and the remaining egg was addled. Next day I found two more nests, one containing a set of three, in which incubation had commenced evenly, the other held two fresh eggs, and on August 24 I found the last nest, which contained a single fresh egg, to which no others were added. Two of these nests contained incomplete sets when found, and an egg was added in each case on succeeding days. As a rule, incubation does not begin until the set is completed, and an egg is deposited daily. Both sexes assist in incubation and in the care of the young. I believe only one brood is raised in southern Arizona in a season. The nests here were placed in willow or mesquite thickets, from 10 to 15 feet from the ground, and they were usually fairly well concealed by the surrounding foliage.

The eggs of the California Cuckoo are usually three or four in number. They are light greenish blue in color, unspotted, and in time this unstable tint fades to a uniform pale yellowish green. They are mostly elliptical oval in shape; a few may be called elliptical ovate, one end being slightly more pointed than the other. The shell is fine grained, rather thin, and without gloss. The eggs average a trifle larger than those of the Yellow-billed Cuckoo.

The average measurement of forty-three specimens in the United States National Museum collection is 30.85 by 23.16 millimetres, or about 1.21 by 0.91 inches. The largest of these eggs measures 33.53 by 24.38 millimetres, or 1.32 by 0.96 inches; the smallest, 27.43 by 21.08 millimetres, or 1.08 by 0.83 inches.

The type specimen, No. 20470 (Pl. 5, Fig. 2), Bendire collection, from a set of four eggs, was taken by the writer on Rillito Creek, near Tucson, Arizona, on July 27, 1872. This is one of the largest eggs in the series, and is slightly faded, fresh eggs looking somewhat brighter.

## 9. Coccyzus erythrophthalmus (Wilson).

BLACK-BILLED CUCKOO.

*Cuculus erythrophthalmus* Wilson, American Ornithology, IV, 1811, 16, Pl. 28.
*Coccyzus erythrophthalmus* Bonaparte, Journal Academy Natural Sciences, Phila., III, ii, 1824, 367.

(B 70, C 290, R 388, C 428, U 388.)

Geographical range: Eastern North America; north in the Dominion of Canada to Nova Scotia, New Brunswick, southern Quebec, and Ontario, to about latitude 47°, and in the provinces of Manitoba and eastern Assiniboia to about latitude 51°; west in the United States to the eastern foothills of the Rocky Mountains, Montana, Wyoming, Colorado, and Texas; south, in winter, to the West India Islands, Central America, and northern South America. Accidental in Great Britain and Italy.

The Black-billed Cuckoo, a slightly smaller bird than the Yellow-billed, is likewise known by the different local names of the latter, and is often mistaken for it. It appears to be somewhat hardier, extending its migrations several degrees farther north, and it breeds throughout its range from about latitude 35° northward. Occasionally it has been reported as breeding still farther south, but below the latitude named it must be considered as an irregular and rare summer resident. In eastern North America it reaches the northern limits of its range in about latitude 47°, while in the interior, in the provinces of Manitoba and eastern Assiniboia, it has been found as far north as latitude 51°, and it ranges probably still farther in this direction. The eastern slopes of the Rocky Mountains appear to form the western limits of its habitat. Here it has been obtained at Pryor's Fork of the Yellowstone, Montana, and I found it breeding on the Little Horn River, near Fort Custer, on June 25, 1885. Mr. W. G. Smith has observed it in Larimer County, Colorado, where he believes it breeds, but it is rare. It is a fairly common species in suitable localities throughout the greater part of its range, and in the more northern portions it outnumbers the Yellow-

billed Cuckoo considerably. In winter it occurs to some extent in Florida and along the Gulf coast, but by far the greater number pass beyond our borders to the West India Islands, and even through Mexico and Central America to northern South America. It usually reenters the United States from its winter haunts in the South during the first half of April, arriving on its more northern breeding grounds generally about a week earlier than the Yellow-billed Cuckoo. The return migration in the fall ordinarily begins in the latter part of September, while a few of these birds linger sometimes well in October and occasionally even until early November.

Its general habits, plumage, manner of flight, food, and many of its call notes are very similar to those of the Yellow-billed species, and it is rather difficult to distinguish one from the other unless very close to them. Like the species referred to, it is eminently beneficial, and deserves the fullest protection. They frequent the same kind of localities, and are especially partial to the shrubbery along water courses, lakes, ponds, hillsides bordering wet meadows, overgrown here and there with clumps of bushes, and the outer edges of low-lying forests, while they are far less often observed in high and dry situations any distance away from water. On the whole, its call notes appear not to be quite so loud as the Yellow-billed Cuckoo's, and rather more pleasing to the ear. Their ordinary note is a soft "cŏŏ-cŏŏ," a number of times repeated. Mrs. Olive Thorne Miller, well known as an enthusiastic and painstaking observer, describes their alarm note as "cuck-a-ruck," and gives a very full and interesting account of the actions of a pair of these birds in her charmingly-written "Little Brothers of the Air." From personal observations, I am inclined to believe that the Black-billed Cuckoo is more irregular in its nesting habits than the Yellow-billed, and that cases of parasitism are of more frequent occurrence. I also think their eggs are much oftener found in different stages of incubation than appears to be the case with the Yellow-billed species.

Mr. J. L. Davison, of Lockport, New York, well known as a careful and reliable ornithologist, in his list of birds of Niagara County, New York, originally published in "Forest and Stream," September, 1889, makes the following remarks about this Cuckoo:

"I have often found the eggs of this species in the nest of *C. americanus*, but only once have I found it in the nest of any other bird. June 17, 1882, I found a Black-billed Cuckoo and a Mourning Dove sitting on a Robin's nest together. The Cuckoo was the first to leave the nest. On securing this I found it contained two eggs of the Cuckoo, two of the Mourning Dove, and one Robin's egg. The Robin had not quite finished the nest when the Cuckoo took possession of it and filled it nearly full of rootlets; but the Robin got in and laid one egg. Incubation had commenced in the Robin and Cuckoo eggs, but not in the Mourning Dove's eggs. I have the nest and eggs in my collection. * * *

"I am also quite certain that I have seen the Black-billed and Yellow-billed Cuckoo feeding young in the same nest, an account of which was published in 'Forest and Stream.' Since then I have found a number of nests containing

the eggs of both species, and have come to the conclusion that I was not mistaken in that observation. On September 10, 1883, I found a nest of the Black-billed Cuckoo containing two young birds not more than one day out of the shell; the two previous nights we had severe frosts that destroyed vegetables."

While instances of the Black-billed Cuckoo laying in the nests of the Yellow-billed are not especially rare, cases where it lays its eggs in those of other species, especially smaller ones than itself, are decidedly uncommon. I have never seen a case of this kind, but, nevertheless, several well-authenticated instances have been recorded which leave no room for doubt; of these I will only quote one, published by Dr. C. K. Clarke, of Kingston, Ontario, Canada, who says: "In an orchard we discovered a Black-billed Cuckoo sitting in a Chipping Sparrow's nest, and the bird did not attempt to move till we almost touched it. It now seemed very evident that the case against the bird was a strong one, and when a Cuckoo's egg was found in the nest the chain of evidence was complete. The egg was hatched and produced a tyrannical young Cuckoo, who turned his companions out of the nest and made himself as comfortable as possible as long as was necessary. Two of us saw the old Cuckoo actually sitting in the nest, and there was no doubt about the matter. We have been informed that the erratic nesting of the Cuckoo has been repeated in the same orchard since the occasion referred to, but of this we have no accurate information."[1]

Its eggs have been found in the nests of the Wood Pewee, Yellow Warbler, Catbird, and others. Nidification commences rather late, rarely before the middle of May; full sets of eggs are sometimes found about the end of this month, but much more frequently during June and July Occasionally a set is met with in the latter part of August, probably a second clutch. The earliest nesting record I know is one of May 7, 1878, where Mr. Robert Ridgway found a set of these eggs near Mount Carmel, Illinois; these are now in the United States National Museum collection. Ordinarily an egg is deposited daily until the set is completed, but not unfrequently they are laid at considerably longer intervals, and it is well known that young of different ages, as well as eggs in various stages of incubation, are sometimes found in the same nest.

The nests of the Black-billed Cuckoo appear to be slightly better built than those of the Yellow-billed species; the platform is usually constructed of finer twigs, the soft inner bark of cedar, fine rootlets, weed stems, etc., and there is generally more lining. This consists of the aments of oak, white and black ash, and maple, willow catkins, and the flowers of the cudweed or everlasting (*Gnaphalium*), dried leaves, and similar materials. The majority of the nests are placed in rather low situations, mostly not over 6 feet from the ground, on horizontal limbs of bushy evergreens, pines, cedars, and hemlocks, or in deciduous trees and shrubs, such as the box elder, chestnut, thorn apple, and beech trees; also in hedges, briar and kalmia patches, occasionally on old logs, and now and then even on the ground. Dr. P. L. Hatch reports such instances in

[1] Transactions of the Canadian Institute, Oct., 1890, Vol. I, Part I, pp. 48–50.

his "Birds of Minnesota," 1892 (p. 222). There is but little difference in the size of their nests from those of the Yellow-billed Cuckoo, and the same measurements will answer for both.

The Black-billed Cuckoo is apt to desert its nest if it knows it has been discovered. Judge J. N. Clark, of Saybrook, Connecticut, writes me: "Of all the Cuckoos' nests which I have found, before the set was complete, if the bird was at the nest, and one generally is, the next visit would always find the nest deserted and one or more of the eggs gone; at least such has been my frequent experience." On the data sheet of a set of three eggs of this species in the Ralph collection, taken on May 29, 1879, by Mr. W. W. Worthington, on Shelter Island, Suffolk County, New York, I find the following entry in the collector's handwriting: "On visiting this nest first it contained two eggs; the following day it was empty. I then left it one day, and on the next visit it contained three eggs. I have carefully examined these eggs, and they certainly look as if they had all been laid by the same bird." I had a somewhat similar experience with the only nest of this species I found near Fort Custer, Montana, on June 22, 1885. This was placed in a bull or buffalo berry bush (*Shepherdia argentea*) close to the banks of the Little Horn River, about 4 feet from the ground. I noticed the bird slipping off as I approached, and on looking into the bush and separating the branches I found the nest and saw that it contained only a single egg, which appeared to be very peculiarly marked. I did not touch this, and left the vicinity at once. On revisiting the place again on the 24th, I found the nest empty and no trace of the egg on the ground below the nest. I was much provoked at not having taken the egg when I first found the nest, as it was a very deeply colored one, and after making a thorough search through the thickets on that side of the river, I gave it up for that day, but returned again on the 25th and examined a patch of wild rose bushes about 100 yards from the old site and on the opposite bank. Almost as soon as I entered this thicket I saw a Cuckoo flying up into a willow sapling and acting in a very excited manner; a few minutes later I found a nest, containing, to the best of my belief, the identical egg I had seen in the first one. The second nest was evidently built in a hurry, and consisted simply of a very slight platform of dry twigs, with scarcely any lining whatever. It was placed 3 feet from the ground, in a dense clump of wild rose bushes, and was well concealed from view. To make sure, this time I took the single egg, which is the most peculiarly colored one I have yet seen of this species, and is reproduced on Pl. 5, Fig. 3.

Although not what might be called a very social bird at any time, occasionally in some particularly suitable place a number of pairs may be found nesting close together. Mr. H. W. Flint, of New Haven, Connecticut, writes me: "I know of one spot in this vicinity where the Black-billed Cuckoo might almost be said to breed in colonies—a sloping hillside near a traveled road. Here I have found seven nests of this species within an hour, none of them placed over 3 feet from the ground. I have also frequently found their nest on

a fallen limb, the top of which was resting upon underbrush. As an exception to their low nesting, I once found a nest containing two well-feathered young and two fresh eggs over 18 feet from the ground, placed in the top of a cedar tree, in a dense thicket of other cedars."

Both sexes assist in incubation as well as in the care of the young; they appear to be devoted parents, and the fact that they are occasionally willing to abandon their young to the mercy of foster parents appears rather unaccountable, to say the least, especially when it is positively known that they occasionally remove their eggs, as well as the young, from one nest to another in order to better protect them from possible harm. In my opinion, the real causes for the so utterly inconsistent behavior on the part of some of these birds are not yet fully understood.

The number of eggs laid to a set varies from two to seven; sets of three or four are most common, and those of over five are rare. Dr. Louis B. Bishop found a set of seven eggs of this species near New Haven, Connecticut, on June 7, 1893, in which three eggs were fresh, in two incubation had just begun, in another it was somewhat more advanced, and in one egg the embryo was well formed. There is frequently considerable difference in size among the eggs found in the same set, although apparently laid by the same bird. In a set of three eggs, for instance, No. 26019, United States National Museum collection, taken by Mr. Thad. Surber, near White Sulphur Springs, West Virginia, on June 3, 1893, the measurements are as follows: 26.92 by 20.07, 24.89 by 19.81, and 22.35 by 18.54 millimetres, or 1.06 by 0.79, 0.98 by 0.78, and 0.88 by 0.73 inches; the difference is, of course, not always so great, but is often quite perceptible. The eggs of the Black-billed Cuckoo are more nearly oval than elliptical oval, and shorter and rounder than those of the Yellow-billed Cuckoo, and much more deeply colored. Like these, they are unspotted; the shell is thin and fine grained, with little or no gloss. Their color is difficult to describe exactly, varying from nile blue to pale beryl green, and occasionally the shell shows a decidedly marbled appearance, caused by different shades running into each other, an illustration of which is shown in Pl. 5, Fig. 3. Aside from their deeper color, they are also readily distinguished from the eggs of the Yellow-billed Cuckoo by their smaller size.

The average measurement of forty-two specimens in the United States National Museum collection is 27.23 by 20.53 millimetres, or about 1.07 by 0.81 inches. The largest egg of the series measures 29.97 by 22.86 millimetres, or 1.18 by 0 90 inches; the smallest, 22.35 by 18.54 millimetres, or 0.88 by 0.73 inch.

The type specimen, No. 22444 (Pl. 5, Fig. 3), a single egg, Bendire collection, was taken by the writer near Fort Custer, Montana, on June 25, 1885, and is a very peculiarly colored specimen, while No. 26019 (Pl. 5, Fig. 4), from a set of three eggs, and taken by Mr. Thad. Surber, on June 3, 1893, near White Sulphur Springs, West Virginia, represents about an average egg of this species.

### 10. Cuculus canorus telephonus (Heine).

SIBERIAN CUCKOO.

*Cuculus telephonus* Heine, Journal für Ornithologie, 1863, 352.
*Cuculus canorus telephonus* Stejneger, Bulletin 29, U. S. National Museum, 1885, p. 224.
(B —, R —, C —, U [388.1.])

Geographical range: Eastern Asia, casually to the Pribilof Islands, Alaska.

The Siberian Cuckoo claims a place in our fauna on the strength of a single specimen having been taken by Mr. William Palmer at Northeast Point, St. Paul's Island, Alaska, on July 4, 1890, which is now in the United States National Museum collection. Mr. Palmer states "when collected it was busily engaged capturing some large flies which are abundant on these islands, and with which its stomach was literally packed. It had been seen by the natives in the same place for more than two weeks, and was probably the same individual seen by myself on June 13, when becalmed in a fog off the eastern side of the same island, on which occasion it circled overhead like a gull for some time, while calmly inspecting the boat, and then moved off northward."[1]

As far as I can learn, nothing definite has as yet been ascertained regarding its nesting habits and eggs. They undoubtedly correspond closely to those of its well-known western relative, the common European Cuckoo, *Cuculus canorus*, and Dr. Stejneger tells me that in its general habits and call notes he could not detect the slightest difference from those of the latter. At his suggestion, I have substituted the name of "Siberian" for "Kamschatkan" Cuckoo, which is more applicable to the bird described by him as *Cuculus peninsulæ*, from Kamschatka.

## Family TROGONIDÆ. Trogons.

### 11. Trogon ambiguus Gould.

COPPERY-TAILED TROGON.

*Trogon ambiguus* Gould, Proceedings Zoological Society, 1835, 30.
(B 65, C 284, R 384, C 422, U 389.)

Geographical range: Southern Mexico from Oaxaca and Guerrero, north to the valley of the lower Rio Grande, in Texas, and the mountains of southwestern New Mexico, and southern Arizona.

The Coppery-tailed Trogon, the only representative of this magnificently plumaged family in the United States, must be considered as a rather rare summer resident within our borders, and very little is yet known about its general habits. There is no longer any doubt, however, that it breeds in some of the mountain ranges of southern Arizona, and probably also in the San Luis Mountains, in the extreme southwestern corner of New Mexico. First Lieut.

[1] The Auk, Vol. XI, 1894, p. 325.

H. C. Benson, Fourth Cavalry, United States Army, secured a young male in its first plumage in the Huachuca Mountains, Arizona, on August 24, 1885, and an adult female was shot in the same vicinity by Mr. F. H. Fowler in the first part of August, 1892. Another adult female, which evidently had a nest close by, was obtained by Dr. Edgar A. Mearns, United States Army, on June 23, 1892, on the east side of the San Luis Mountains, close to the Mexican boundary line. The long tail feathers in this specimen are much worn and abraded, and look as if the bird had passed considerable time in very limited quarters. Its mate was also seen, but not secured. Judging from the character of the country this species inhabits in southern Arizona, that is pine forest regions, it is probably only a straggler in the lower Rio Grande Valley in Texas, and does not breed there.

Dr. A. K. Fisher has kindly furnished me with the following notes on this species: "Soon after arriving at Fort Huachuca, Arizona, I learned that the Trogon was not uncommon among the pines in the neighboring mountains. A reliable young man informed me that he had killed three during the previous season (1891), and a rancher who raises fruit in Ramsay Canyon stated that the species visited the gardens in considerable numbers, especially during the period when cherries were ripe. He had noticed the first arrival on May 17.

"On June 9, in company with Capt. J. L. Fowler and his son Frederick, I made a trip toward the head of Tanner or Garden Canyon, as it is more commonly designated in the vicinity. While riding up the shady trail among the pines a beautiful male Trogon flew across the path and alighted among the trees on the opposite side of the narrow canyon. It was impossible to follow it and to pass through the thick underbrush and loose rocks without making considerable noise, which startled the bird, and it was finally lost among the thick foliage. Higher up in the mountains we heard its peculiar note, which was uttered at regular intervals, and closely resembled that of a hen Turkey. Later in the afternoon, on the way down, another was heard, and by carefully approaching along the hillside a male was discovered sitting on the lower limb of a pine. It sat straight upright, with the tail hanging perpendicular to the body, and while uttering its note the head was thrown backward and the bill extended nearly upward. After watching the bird for a few moments it was secured. The testes were well developed. The stomach contained a few smooth caterpillars."

The general habits of the Coppery-tailed Trogon probably do not differ much from those of other members of this family about which a little more is known. According to Gould, who published a magnificent monograph of this family, "Trogons are usually found singly or in pairs, and keep mostly in the shade of forest trees, perching on the lower limbs of these. During the breeding season they are continually calling to each other, and are called '*Viadas*' (Widows) by the Mexicans; they are easily located on this account and are not particularly shy. Their food consists of fruit, grasshoppers, and other insects, and in their actions while catching the latter they are said to resemble a Fly-catcher, starting and returning from a perch like these birds, and often sitting

for hours in the same place. They are often met among flocks of other birds, such as Flycatchers, Tanagers, Creepers, and Woodpeckers."[1]

All of the Trogons, whose mode of nidification is known, resort to natural cavities in trees or to some of the larger woodpecker holes, the eggs being deposited in the bottom of the hole, on the rubbish or chips which may be found in it. These are said to vary from two to four, more likely the former number. As far as known, they are unspotted; the egg of the handsome Quezal (*Pharmocrus mocinno*) is described as of a pale bluish-green color; that of the Mexican Trogon (*Trogon mexicanus*) is said to be very pale greenish, while the eggs of *Trogon surucua* from Paraguay are said to be pure white.

I have seen eggs purporting to belong to this species; but their large size, as well as the source from which they came, do not warrant me in giving measurements or a description of these specimens, and as far as I know genuine eggs of the Coppery-tailed Trogon still remain to be described.

## Family ALCEDINIDÆ. Kingfishers.

### 12. Ceryle alcyon (Linnæus).

BELTED KINGFISHER.

*Alcedo alcyon* Linnæus, Systema Naturæ, ed., 10, 1, 1758, 115.
*Ceryle alcyon* Bonaparte, Proceedings Zoological Society, 1837, 108.
(B 117, C 286, R 382, C 423, U 390.)

Geographical range: North America generally; south to Panama and the West Indies.

The Belted Kingfisher, ordinarily simply called "Kingfisher," is one of our best-known birds, and it is generally distributed in suitable localities throughout the North American Continent, though seldom very common anywhere. Its breeding range extends from Florida and Texas north to the shores of Labrador, Hudson Bay, the Arctic Ocean, and Bering Sea. In the more northern parts of its range it is only a summer resident, but not a few winter in some of the New England and other Northern States, as well as in Oregon and Washington, on the Pacific coast. These birds which brave the severe winter climate along our northern border are probably migrants from the far North, and better adapted to withstand the cold, the only requisite being sufficient open water to enable them to obtain their necessary supply of food. In the mountain regions of Colorado, Wyoming, and Montana they range to an altitude of 9,000 feet in summer, and perhaps still higher, while in the southern Sierra Nevada they reach nearly the same elevations.

In its general appearance the Kingfisher is a striking but rather top-heavy looking bird; its satin-like plumage feels dense and smooth to the touch, as if it was oiled, while its soft, weak feet look out of all proportion to its rather large

[1] Monograph of the Trogonidæ, 2d ed., 1875, Pl. VIII, not paged.

head and body. They seem almost inadequate to support its weight, and certainly do not appear to be much adapted to walking, an exercise which I have never seen one indulge in.

In its disposition it must be classed among the unsocial and quarrelsome birds, and, excepting during the mating and breeding season, it is rare to see two together. As in everything else, however, there appear to be exceptions to this rule, as Mr. W. E. Loucks, of Peoria, Illinois, writes me: "Along the Cedar River, in Iowa, I found these birds in great numbers. A large clay bank along the river resembled a honeycomb, so numerous were the holes made by these birds. This is the only case that I know of where Kingfishers have been found breeding in close proximity."

As a rule each pair of birds seem to claim a certain range on some suitable stream, lake, or mill pond, and should others intrude on this they are quickly driven off. Clear streams or ponds, bordered with perpendicular banks and low, brush-covered shores, are their favorite resorts, and along such places one will not have to go far before hearing the characteristic rattle of the Kingfisher, or perhaps seeing one perched on a partly submerged snag or rock, on a pile of driftwood near the shore, or on some small branch directly overhanging the water. Every bird seems to have several favorite perches along its range, each perhaps quite a distance away from the next, to which it flies from time to time, generally uttering its well-known shrill rattle in doing so. It is a sedentary bird, but ever watchful and rather shy, sitting frequently for an hour at a time in the same position, occasionally moving its head back and forward, watching for its prey as a cat does for a mouse. In such a posture the Kingfisher is one of the most charming features of brook and pool. Should an unfortunate fish come within sight at such times, our lone fisher is at once alert enough, craning its neck and looking into the water, until the proper moment arrives for it to plunge downward, head first, completely disappearing out of sight, and usually emerging with a wriggling captive firmly grasped in its bill, for it rarely misses its victim. It generally rises some feet into the air before dashing perpendicularly into the water.

While different kinds of small fish undoubtedly constitute a large part of the Kingfisher's food where readily procurable, various species of crustacea, as well as insects, such as coleoptera, grasshoppers, and the large black crickets found in many of our Western States, are also eaten to a greater or less extent, according to circumstances; frogs and lizards are also acceptable prey. In southern Arizona, for instance, where running streams are few, I have found Kingfishers breeding in localities where fish must have formed but a very small percentage of their daily fare; there they lived principally on lizards, beetles, and large grasshoppers. I have more than once seen one of these birds perched on some twig overhanging a dry, sandy river bed, where no water was to be found within several miles, on the watch for the kind of food procurable in such localities.

Mr. W. E. Loucks writes me that he has found nests of these birds in the banks of dried-up streams, miles from any water containing fish, and says that

he does not know upon what the parents fed their young. In fact, even in places where they can readily live on fish, they do not appear to confine themselves to such an exclusive diet. While stationed at Fort Klamath, Oregon, I placed a small steel trap on top of a post standing some 10 yards from the banks of Fort Creek, a clear mountain stream abounding in fish, for the purpose of catching a Screech Owl I often heard calling in the vicinity and was anxious to obtain, but was not able to see to shoot on account of the dense fir trees it frequented. I finally concluded to try trapping it. Twice I baited the trap with mice, and once with a small bird, and on the next morning I found a Kingfisher caught by the neck; it had evidently plunged down on the bait to carry it off. The post in question had, as far as I know, never been used as a perch or lookout by the Kingfishers, as it was too far from the creek. Judging from these occurrences, I believe that not a few mice, and possibly small birds also, are caught by them during their nocturnal rambles, and they are certainly fully as active throughout the night as in the daytime.

In favorite spots where fish are plenty, and where there is no suitable place for a perch, they sometimes remain poised over such localities for a minute or more, hovering in the air some 6 feet or more over the water, as does the Sparrow Hawk when searching for grasshoppers and mice in a meadow. When a fish is caught it is at once carried in the bill to the nearest perch or rock, against which it is beaten until dead, and is then swallowed head first. The indigestible parts, such as bones and scales, are afterwards ejected in oblong pellets, which can be seen lying around in their burrows or about their favorite perches.

By far the larger number of fish caught by the Kingfisher consist of species not considered worth much as food fishes, and they rarely average over 3 inches in length. Occasionally, however, a larger one is mastered by one of these birds. Mr. Manly Hardy, of Brewer, Maine, writes me: "I shot a Kingfisher last spring which had swallowed a pickerel considerably longer than the bird from the end of the bill to the tip of the tail, the tail of the fish protruding from the throat, while the head was partly doubled back, causing a large protuberance near the vent."

In stormy weather, when the water becomes rough or muddy, these birds suffer greatly and sometimes almost perish from want of food, and then occasionally resort to eating vegetable matter to sustain life. Dr. Elliott Coues has published the following observations on this subject, communicated by Mrs. Mary Treat, Green Cove Spring, Florida: "A Kingfisher whose feeding ground is just in front of my windows fishes from a private wharf, where he is seldom disturbed, and has become so tame that he pursues his avocations without concern, though I may be standing within a few feet of him. * * * When the water is so rough that it is difficult for him to procure fish, instead of seeking some sequestered pool he remains at his usual post, occasionally making an ineffectual effort to secure his customary prey, until, nearly starved, he resorts to a sour-gum tree (*Nyssa aquatica* L.) in the vicinity, and greedily devours the berries. Returning to his post, he soon ejects a pellet of the large seeds and

skins of the fruit. I have saved some of these pellets as well as those composed of fish bones and scales."[1]

The first migrants to return from their winter quarters appear in the Middle States generally about the second week in March, and sometimes a week or so later, according to the season, and in higher latitudes considerably later and not until after the ice commences to break up. In our Southern States nidification commences usually in April; in the Northern ones, rarely before the first week in May, and in arctic North America and northern Alaska, seldom earlier than the latter half of June. Mr. Charles H. Townsend, of the United States Fish Commission, in 1885 found these birds common and breeding on the shores of the Kowack River, near Kotzebue Sound, Alaska, and within the Arctic Circle, the most northern breeding record known to me. The return migration from their breeding grounds in our Northern States sometimes begins about the latter part of September, and in mild falls not before the middle of October, and occasionally still later, they remaining until the streams become covered with ice.

The favorite nesting sites of the Kingfisher are perpendicular clay or reasonably compact sand banks, occasionally mixed more or less with gravel; also railroad cuts. These banks or bluffs usually abut directly on water. A nearly circular burrow or tunnel is dug into these, averaging about 4 inches in diameter. They are excavated by the birds; the entrance hole is usually from 2 to 3 feet below the top of the bank, but sometimes fully 20 feet from the top. The burrows vary in length from 4 to 15 feet, according to the nature of the soil, and sometimes run in perfectly straight for the entire distance; again they diverge at different angles, at various distances from the entrance. The nesting chamber is dome-shaped, usually from 8 to 10 inches in diameter, and always at a slightly higher level than the entrance hole. The time required to dig out a burrow depends largely on the nature of the soil to be removed, taking sometimes two or three weeks, but generally much less. I have personally seen an instance where a pair of these birds excavated a new burrow in a rather friable clay bank near Fort Lapwai, Idaho, to a depth of 5 feet (estimated measurement) in a little over three days. How they manage to dig so rapidly, considering their short and weak-looking feet, with which they must remove the greater part of the material, has always been a mystery to me, and I would not believe them capable of accomplishing such an amount of work had I not seen it done. When not disturbed the same nesting site is resorted to from year to year. Sometimes the male burrows an additional hole near the occupied nesting site, usually not over 3 feet deep, to which it retires to feed and to pass the night.

Dr. William L. Ralph informs me that he has found them occupying the old burrows of Rough-winged Swallows, *Stelgidopteryx serripennis*.

Dr. A. K. Fisher has kindly furnished me the following notes on the nesting habits of this species as observed by him: "On June 6, 1882, the writer found two nests of the Kingfisher in the side of a railroad cut near Croton Lake, Westchester County, New York. The burrows were placed in a bank not over

[1] Bulletin Nuttall Ornithological Club, Vol. III, 1878, p. 92.

7 feet above the roadbed and within 18 inches of the top. That of the first one ran in about 7 feet and turned to the right as it entered the nesting chamber. The seven fresh eggs were placed in a nest of coarse grass, which, although rather scanty, covered the floor of the cavity on all sides. The burrow of the second one extended in about 4½ feet, and, like the other previously mentioned, turned toward the right as the expanded nesting cavity was reached. The nest, which was quite elaborate, was composed wholly of fish scales and bones, arranged in a compact, saucer-shaped mass. The writer made a tunnel from the top of the bank so as to intercept the burrow as it entered the nesting cavity. Viewed through this hole, the nest was a beautiful affair. The scales, which looked as if made of frosted silver, formed a delicate setting for the six pure-white eggs lying in the center, and by the projected light made a most effective picture. On two occasions, near Sing Sing, New York, the writer found the Kingfisher and Rough-winged Swallow using burrows having a common entrance. It is probable in each case that the swallow had commenced its diverging burrow after the larger bird completed its work."

The number of eggs varies usually from five to eight, and sets of six or seven are most often found. Instances, however, have been recorded where as many as fourteen eggs have been found at one time, and Mr. Charles A. Strawn, of Cerro Gordo, Arkansas, informed Mr. Robert Ridgway, under date of March 22, 1890, that he had taken eleven young Kingfishers out of a burrow on Dog River, Douglas County, Georgia. How the female managed to cover this number of eggs and hatch them all is certainly surprising. If the first set of eggs is taken, the birds abandon the burrow and excavate a second one near by, and frequently within a few feet of the first one, and lay a second set, consisting rarely of more than six eggs. Only a single brood is raised in a season. In a newly excavated nest the eggs are usually laid on the bare ground, while in such as have been occupied in previous seasons the eggs are frequently found deposited on quite a thick layer of fish bones, scales, crawfish shells, and wing covers of beetles remaining from former years, but which can not be considered as part of the nest. The male does not assist in incubation, but supplies its mate with food while so engaged, and she rarely leaves the nest after the first egg has been laid; at any rate I have invariably found the bird at home if there were any eggs in the nest. Incubation lasts about sixteen days. The young when first hatched are blind, perfectly naked, helpless, and, in a word, very unprepossessing. They scarcely look like birds while crawling about in the nest, where they remain several weeks, their growth being very slow. The excrement of the young is promptly removed and the burrow is kept rather clean. They utter a low, puffing sound when disturbed, and frequently vary considerably in size, as if incubation, in some instances at least, began with the first egg laid. The young, even after they have left the nest for some time, require the attendance of their parents before they are able to secure subsistence for themselves.

The eggs of the Kingfisher are pure white in color; the shell is strong, fine grained, smooth, and rather glossy, especially so in fresh eggs; in strongly incu-

bated ones this gloss is less noticeable. They are generally short ovate and sometimes rounded ovate in shape.

The average measurement of eighty-seven eggs in the United States National Museum collection is 34.04 by 26.67 millimetres, or 1.34 by 1.05 inches. The largest egg of the series measures 37.08 by 27.94 millimetres, or 1.46 by 1.10 inches; the smallest, 30.78 by 26.42 millimetres, or 1.21 by 1.04 inches.

The type specimen, No. 20467 (Pl. 1, Fig. 3), from a set of six eggs, Bendire collection, was taken by the writer near Fort Lapwai, Idaho, on May 11, 1870, and represents about an average-sized egg.

## 13. Ceryle americana septentrionalis SHARPE.

TEXAN KINGFISHER.

*Alcedo cabanisi* TSCHUDI, Fauna Peruana, Ornithologie, 1844, 253.
*Ceryle americana septentrionalis* SHARPE, Catalogue of Birds, British Museum, XVII, 1892, 134.

(B 118, C 287, R 383, C 424, U 391.)

GEOGRAPHICAL RANGE: From the Isthmus of Panama north through Central America to northern Mexico, Chihuahua, and southwestern Texas.

The Texan Kingfisher, the smallest representative of the *Alcedinidæ* found in the United States, is not nearly as well known as the Belted Kingfisher, and its breeding range is confined to a comparatively small portion of western Texas, while even here it appears to be of rather irregular occurrence. It is reported as fairly abundant along a number of the tributaries of the Guadalupe River, in Comal County, also on some of the streams in Bexar and Edwards counties, and thence westward along the various tributaries to the Rio Grande, like Devils River, etc. Dr. Edgar A. Mearns, United States Army, met with it in Kenney County, at Fort Clark, at Strickland's Springs, and Las Moras Creek, and it seems to be present on nearly every creek or stream whose waters are sufficiently clear to enable it to make a living. It is not found regularly along the shores of muddy streams, such as the lower Rio Grande and Nueces rivers and others in southwestern Texas, and its presence seems to depend almost entirely on the clearness of the water. It reaches the northern limits of its range in Texas, as far as known, in about latitude 30°, but in northern Mexico it ranges at least a degree farther north. Dr. Edgar A. Mearns, United States Army, while on duty with the International Boundary Survey, obtained a specimen at Pajon Bonito, Chihuahua, September 8, 1893, 10 miles southeast of monument 66, close to the Arizona line, which is the most northern record known to me. It appears to be a constant resident in southwestern Texas, and breeds wherever found.

Its general habits, food, and breeding habits are similar to those of the Belted Kingfisher. Mr. W. Brewster described the first authentic eggs of this species taken within our borders, in the "Bulletin of the Nuttall Ornithological Club" (Vol. 4, 1879, pp. 79, 80). He says: "This beautiful little Kingfisher was

found by Mr. W. H. Werner in comparative abundance at several points in Comal County, notably about some of the springs that empty into the Guadalupe River. A set of six eggs taken in April, 1878, was authenticated by the capture of both parent birds, the female being caught on the nest. * * * The nesting cavity was in a sand bank near the water's edge; the eggs were laid on the bare sand, no fish bones or other extraneous material being near. The entrance was not quite $1\frac{3}{4}$ inches in diameter, and the hole extended inward from the face of the bank about $3\frac{1}{2}$ feet." * * *

The nests of many of these little Kingfishers are yearly destroyed by high water flooding their burrows, caused by heavy rains and cloud-bursts, which are more or less prevalent in southern and western Texas. It is not uncommon on both the Medina and San Antonio rivers, and a nesting site on the last-mentioned stream found by Mr. C. H. Kearny, in the spring of 1892, containing six fresh eggs, is described by him as being located in a bank about 15 feet high and about 5 feet above the water level. The nesting chamber, which was slightly larger than the tunnel leading to it, was placed about 2 feet from the mouth of the hole. There was no nest proper, but a few fish bones and scales were scattered about the eggs. In the same bank a number of Bank Swallows (*Clivicola riparia*) had taken up temporary homes, and one of their holes was located within a foot of that of the Kingfishers. They are devoted parents, and these birds will usually allow themselves to be caught rather than forsake their eggs. They generally are five or six in number, and, like the eggs of all Kingfishers, they are pure white in color and unspotted. The shell is close grained, but rather thin, and while some sets are quite glossy, others show little or no luster. They are usually rounded elliptical oval in shape, and not short ovate, like the majority of the eggs of the Belted Kingfisher.

The average measurement of fourteen eggs is 24.38 by 18.53 millimetres, or 0.96 by 0.73 inch. The largest egg measures 25.40 by 19.05 millimetres, or 1 by 0.75 inch; the smallest, 23.62 by 18.29 millimetres, or 0.93 by 0.72 inch.

The type specimen, No. 20468 (Pl. 1, Fig. 4), from a set of five eggs, Bendire collection, was taken near New Braunfels, Texas, on March 4, 1879, and represents an average egg of this species.

## 14. Ceryle torquata (Linnæus).

RINGED KINGFISHER.

*Alcedo torquata* Linnæus, Systema Naturæ, ed. 12, I, 1766, 180.
*Ceryle torquata* Boie, Isis, 1828, 316.

(B —, C —, R —, C — U [390.1].)

Geographical range: From southern Argentina north through South and Central America to northeastern Mexico (Nuevo Leon), and casually to the lower Rio Grande Valley in Texas.

This handsome Rufous-breasted Kingfisher, the largest found on the American continent, has a wide distribution, occurring in suitable localities throughout the greater part of South America, the whole of Central America, and most of

Mexico. It has only recently been added to our fauna, and it is doubtful if it breeds within our borders. An adult female was shot by Mr. George B. Benners, of Philadelphia, Pennsylvania, on June 2, 1888, about a mile below Laredo, Texas, on the United States side of the Rio Grande. He says: "It was sitting on some old roots which had been washed up into a heap by the current of the river, and was shot immediately, so I did not see it fly or hear its call." This specimen is now in possession of the Academy of Natural Sciences of Philadelphia, Pennsylvania.[1]

Although moderately common, and distributed over extensive areas, very little has as yet been published about the life history of this giant among Kingfishers. Dr. Herman Burmeister, in his "Thiere Brasiliens," 1856 (Vol. I, p. 415), says: "This is the largest of the American Kingfishers, and it is pretty generally distributed over the warmer portions of South America, along the shores of wooded streams, where it sits on limbs overhanging water, watching for fish, which constitute its principal food. It nests in perpendicular banks, occasionally quite a distance from water, in burrows from 5 to 6 feet deep, and lays two white eggs."

Mr. Charles W. Richmond, in his interesting paper on "Birds from Nicaragua and Costa Rica," makes the following remarks about the species: "Very common. This species has a note similar to that of *C. alcyon*, but somewhat stronger. One morning a pair of these birds went through a very curious performance. Attention was first called to them by their loud, rattling cry, which was kept up almost constantly as they circled and gyrated about over the water, occasionally dropping, not diving, into the water, and sinking below the surface for a moment. This maneuvering lasted some minutes, after which both birds flew upstream, uttering their ordinary note.

"Two or three individuals were in the habit of passing the night at some point on the creek back of the 'L. P.' plantation, and came over just about dusk every evening. I noticed them for several months, and was struck with the regularity of their coming and the course taken by each on its way to the roost. The birds could be heard a considerable distance away just before dusk, uttering their loud, single 'chuck' at every few beats of the wings. They appeared to come from their feeding grounds, often passing over the plantation opposite, probably to cut off a bend in the river. One of the birds invariably passed close to the corner of the laborers' quarters, though at a considerable height, and the other near a trumpet tree some distance away. The third bird was only a casual visitor. At times the birds came together, but usually there was an interval of several minutes. Their routes met at a turn of the creek a few rods back of the house, where they usually sounded their rattling notes and dropped down close to the water, which they followed to the roost. This was in a huge spreading tree, covered with parasitic plants and numerous vines, which hung in loops and festoons from the limbs. On one occasion I shot at one of the birds as it came clucking overhead, and caused it to drop several

[1] The Auk, Vol. XI, 1894, p. 177.

small fish. A female nearly ready to deposit eggs was shot October 9. The birds made their appearance rather late in the morning, usually after 8 o'clock, and at times spent several hours of the day up there. Although the birds appeared to have their home at this place, I did not, on any of my numerous trips up the creek, discover the site."[1]

From Mr. Richmond's observations it would appear as if *C. torquata* nested at all times of the year.

The most northern Mexican record for this species is, I believe, the one from Rio de las Ramos, State of Nuevo Leon, in about latitude 25° 30′. This specimen was obtained by Mr. W. Lloyd, on February 28, 1891, and is now in the collection of the United States Department of Agriculture.

I have been unable to find a more accurate description of the eggs of this species than the one above given, but, judging from the size of the bird, they should be considerably larger than those of *C. alcyon.*

## Family PICIDÆ. Woodpeckers.

### 15. Campephilus principalis (Linnæus)

IVORY-BILLED WOODPECKER.

*Picus principalis* Linnæus, Systema Naturæ, ed. 10, I, 1758, 113.
*Campephilus principalis* Gray, List Genera of Birds, 1840, 54.
(B 72, C 293, R 359, C 431, U 392.)

Geographical range: South Atlantic and Gulf States; north to the southern portions of South Carolina, Georgia, Alabama, Mississippi, and Arkansas; west to southeastern Texas. Formerly north to North Carolina, Tennessee, Kentucky, southern Indiana, Illinois, southern Missouri, and the southern parts of the Indian Territory.

The Ivory-billed Woodpecker, also called "White-billed Woodpecker," "White-billed Logcock" and "Woodcock," is the largest representative of this family found in the United States, being a resident of the mainland and the numerous islands along the south Atlantic and Gulf coasts and breeding wherever found. In former years its range was much more extended than it is at present; then it penetrated well into the interior, along the shores of the Mississippi River and its larger tributaries, having been reported from White County, Illinois; Franklin County, Indiana, and Franklin County, Tennessee, as well as at other points inland. At present it appears to be fairly abundant in Florida, in portions of southern Mississippi along the Yazoo River, and in the extensive swamps in southern Louisiana. In the first-mentioned State Mr. Arthur T. Wayne obtained not less than thirteen specimens in the month of April, 1893, and about ten more were seen. He says, "A young female taken April 15 was about two weeks from the nest. I never observed it singly, it being always seen in company with two or three others of this species. I was told by old hunters that they breed early in February. The locality where this bird is to be found at all times is in

[1] Proceedings of the U. S. National Museum, Vol. XVI, pp. 510, 511.

what the people call 'burn-outs.' These are large tracts of heavy timber which the forest fires have destroyed; and the dead trees harbor beetles, etc. A nest which I examined was dug in a live cypress about 50 feet high."[1]

Mr. E. A. McIlhenny has kindly furnished me with the following notes on this interesting species: "In the cypress swamps adjacent to Avery's Island, Louisiana, these noble birds are still quite common, and here, in their favorite haunts, I have watched them for years. I believe they remain mated for life, for I have observed several pairs of them year in and year out, and can always find them near the spot where they have their nest or winter home, from which place they are hard to drive away, thereby showing a fondness for locality seldom seen in birds of this family. The nest is generally placed in a cypress or tupelo gum tree, one that is partly dead being preferred, and the cavity is excavated in the dead part of the tree. I have never found a nest in wood in which there was sap, or in rotten wood. The site for the nest being chosen, the female begins the excavation during the last week in March or the beginning of April, and from eight to fourteen days are spent in finishing it, the female doing all the work, while the male sits around and chips the bark from the neighboring trees. The eggs are deposited as early as April 9, on which date I took a set of three fresh eggs in 1892, and on May 19 I took from the same pair, in the same tree, but in a lower excavation, a set of four eggs in which incubation was considerably advanced. But one brood is reared in a season, and the young remain with the parents until the mating season in the following year.

"A typical nest of this bird is one I found on May 2, 1892. It was situated in a partly dead cypress, 41 feet up. The entrance was oval and measures $4\frac{1}{8}$ by $5\frac{3}{4}$ inches. The excavation was $21\frac{1}{2}$ inches deep, and was much larger at the bottom than at the top. It contained three eggs, deposited on about an inch of fine chips. The eggs measured 1.40 by 1.01, 1.38 by 1.02, and 1.37 by 1.02 inches; they are very glossy and quite pointed. When the young are hatched, both parents feed them, often going quite a distance into the open country in search of food. As soon as they leave the woods they mount to a considerable height, their flight being very strong, and, like that of all Woodpeckers, undulating. The only note I have heard these birds give is made while on the wing; it is very shrill, and resembles somewhat the call of the Pileated Woodpecker, but is quite beyond being put on paper; the call of the female does not perceptibly differ from that of the male. They are very silent birds at all times, and during the breeding season I have never heard their cry. They have, however, another mode of calling each other: one bird will alight on a dry limb of some tree and rap on it with its bill so fast and loud that it sounds like the roll of a snare drum; this it continues to do at short intervals until its mate comes. When in search of food this bird evinces great cleverness. It will alight on a dead limb, and after tapping it a few times with its beak it puts its ear to the wood and listens for the movements of any grub that may be

[1] The Auk, Vol. X, 1893, p. 338.

at work there, and after it locates one, the energy it displays in getting at it is remarkable. It braces itself with the stiff feathers of its tail, and in striking a blow uses the body from the legs up to give force to it. The blow it delivers while in this position is very hard, and sounds as if some one was striking on a tree with a hammer. Its food consists of grubs and insects that inhabit decayed wood. In the fall and winter it feeds to some extent on the mast of the live oak, and stores acorns in holes for its winter supply. I have seen them destroy the nests of the gray squirrels to obtain the acorns and nuts they had put by for the winter. They would sit on the top of the nest and with a few strokes of their bill scatter it in every direction."

In a recent interview with Mr. McIlhenny he told me that he found another nest of this species in the early part of May, 1894, containing five young about three days old, whose eyes were still closed. The nesting site was in a dead gray oak, in the main trunk, about 30 feet from the ground, and the cavity was about 3 feet deep; the female was in the hole, and flew out when the tree was struck; the male was not seen.

According to Audubon, this bird feeds on grapes, blackberries, and persimmons. Mr. Maurice Thompson states that it eats ants, and he published a very interesting article on this species under the title of "A Red-headed Family," which may be found in the "Oologist" (Vol. VI, February, 1889, pp. 22–29), and is well worth reading.

The eggs of the Ivory-billed Woodpecker are still quite rare in collections. The Public Museum, in Milwaukee, Wisconsin, contains a set of three, presented by the late Capt. B. F. Goss, who wrote to me that they were taken in the Neches River bottom, in Jasper County, Texas, on May 3, 1885. The cavity was about 2 feet deep, situated 40 feet from the ground, and the entrance was large enough to admit the collector's arm. The American Museum of Natural History, in New York, contains a set of four eggs taken on April 10, in the Alatamaha Swamp in Georgia, by the late Dr. S. W. Wilson. These measure 1.36 by 0.95, 1.34 by 0.98, 1.25 by 0.95, and 1.29 by 0.98 inches. The United States National Museum has five of these eggs. Two were received from Mr. N. Giles, of Wilmington, North Carolina, but no date or locality is given; the remaining three are a set from the Ralph collection, taken in Lafayette County, Florida, on April 19, 1893. One of these eggs contained a large embryo; the other two were addled. The nesting site was excavated in a dead bay tree, 30 feet from the ground, and the cavity was 2 feet deep. The female was shot when the eggs were taken.

Mr. W. E. D. Scott makes the following statement: "To-day, March 17, 1887, I found a nest of the Ivory-billed Woodpecker, and obtained both parent birds and the single young bird which was the occupant of the nest. The cavity was dug in a large cypress tree in the midst of a dense swamp, and was 41 feet from the ground. The opening was oval, being $3\frac{1}{2}$ inches wide and $4\frac{1}{2}$ inches high. The same cavity had apparently been used before for a nesting place; it was cylindrical in shape and a little more than 14 inches deep. The

young bird in the nest was a female, and, though one-third grown, had *not yet opened its eyes*. The feathers of the first plumage were apparent, beginning to cover the down, and were the same in coloration as those of the adult female bird."[1]

Recent observations all tend to show that the Ivory-billed Woodpecker is an exceedingly wild and suspicious bird, and as the country becomes more settled it retires from the advance of civilization to the more inaccessible swamps, where it is not so liable to be molested. In such localities it appears to be still reasonably common, as well as on some of the islands off the south Atlantic and Gulf coasts. The present restriction of its range is probably due more to its wild and suspicious nature than to actual decrease in numbers, as it has but few enemies excepting man, and is well able to protect itself against the others. One of the most notable differences in the nesting habits of this handsome Woodpecker appears to be the fact that instead of making a round entrance hole, as do the smaller members of this family found in the United States, it prefers one which is oval in shape.

The eggs of the Ivory-billed Woodpecker are pure china white in color, close grained, and exceedingly glossy, as if enameled. They vary in shape from an elongate ovate to a cylindrical ovate, and are more pointed than the eggs of most of our Woodpeckers. They appear to me to be readily distinguished from those of the Pileated Woodpecker, some of which are fully as large. From three to five eggs are laid to a set, and only one brood is raised in a season. As both sexes among all the better-known species of Woodpeckers assist in incubation, it is probable that the same holds good with this species as well, and this lasts probably from sixteen to eighteen days.

The average measurement of thirteen eggs is 34.87 by 25.22 millimetres, or about 1.37 by 0.99 inches. The largest egg measures 36.83 by 26.92 millimetres, or about 1.45 by 1.06 inches; the smallest, 34.54 by 23.62 millimetres, or about 1.36 by 0.93 inches.

The type specimen, No. 26365 (not figured), from a set of three eggs, Ralph collection, was taken in Lafayette County, Florida, April 19, 1893.

As all Woodpeckers' eggs are pure white, and as many differ only very slightly in size and shape, but considerably in the degree of glossiness, which could not be accurately shown in the illustrations, I have only figured the eggs of two well-known species, selecting those of the Pileated and Downy Woodpeckers, which show fairly well the extremes in size.[2]

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[1] The Auk, Vol. V, 1888, p. 186.

[2] I had hoped to be able to add the large Imperial Woodpecker, *Campephilus imperialis*, to our list before this volume went to press. Lieut. Harry C. Benson, Fourth Cavalry, U. S. Army, found it to be common in the pine forests of the Sierra Madre in northern Sonora, Mexico, in 1887, and shot a specimen within 50 miles of the boundary line; but up to date it has not been observed by either Dr. A. K. Fisher or Mr. W. W. Price, who both collected in the Chiricahua Mountains during the summer of 1894, where it is most likely to be found.

## 16. Dryobates villosus (Linnæus).

HAIRY WOODPECKER.

*Picus villosus* Linnæus, Systema Naturæ, ed. 12, I, 1766, 175.
*D[ryobates] villosus* Cabanis, Museum Heineanum, IV, June 15, 1863, 66.
(B 74, part; C 298, part; R 360; C 438, part; U 393.)

Geographical range: Eastern North America; north in the southern provinces of the Dominion of Canada to Nova Scotia, New Brunswick, southern Quebec, Ontario, and southern Manitoba; south through the United States, excepting the South Atlantic and Gulf States; west to eastern Montana and Wyoming, Nebraska, Kansas, the Indian Territory, and eastern Texas. Accidental in England.[1]

The breeding range of the Hairy Woodpecker, also known as "Big Sapsucker" and "Big Guinea Woodpecker," is coextensive with its geographical range, and it is generally a constant resident wherever found. It is fairly common through the wooded regions of our Northern and Middle States, and in winter is occasionally found in some of the Southern States—Louisiana, for instance. It is a resident in the mountainous portions of North Carolina, while in the lowlands it is replaced by the smaller southern race, *Dryobates villosus audubonii*. It is a hardy bird, and intense cold does not appear to affect it much. As a rule it is rather unsocial, and, unless followed by their young, more than a pair are rarely seen together. It does not live in harmony with smaller species of its own kind, and drives them away, when they encroach on its feeding grounds, being exceedingly greedy in disposition and always hungry. It is partial to timbered river bottoms, the outskirts of forests, and occasionally it makes its home in old orchards and in rather open, cultivated country, interspersed here and there with isolated clumps of trees; it is also found in the midst of extended forest regions.

The Hairy Woodpecker, like most of its relatives, is an exceedingly beneficial and useful bird, which rids our orchards and forests of innumerable injurious larvæ, like those of the Boring Beetles, *Buprestidæ*, which burrow in the wood and between the bark and trunk of trees. It never attacks a sound tree. Although commonly known as Sapsucker, this name is very inappropriate; it is not in search of sap, but of such grubs as are found only in decaying wood; nevertheless it is exceedingly difficult to make the average farmer believe this, and in winter, when these birds are more often seen about the vicinity of dwellings and the neighboring orchards than at other seasons of the year, many are shot under the erroneous belief that they injure the very trees they are doing their best to protect. In central New York, and undoubtedly in other sections as well, where a few decades ago one could see some of the finest apple orchards to be found anywhere, you may look in vain for them now. Nearly every tree

[1] Mr. E. W. Nelson, in his report upon the Natural History Collections made in Alaska in the years 1877–1881, p. 145, records this species as occurring in British Columbia and thence north along the southeastern coast of Alaska. I have not been able to find any specimens collected by him in the U. S. National Museum collections and simply mention this record.

of any size now shows abundant and unmistakable signs of decay, caused by the increase of the insects which live in them and the decrease of such birds as destroy these pests. In Oneida and Herkimer counties, New York, the top of nearly every black ash tree is dead and the trees are slowly decaying, undoubtedly due to some species of boring beetle; there are not enough Woodpeckers left to check the increase of these pests, and not alone the orchards but quantities of valuable timber are being slowly but surely destroyed by them.

The food of the Hairy Woodpecker, besides larvæ, consists of various species of small beetles, spiders, flies, ants, and in winter, when such food is scarce, to some extent of seeds and grain, and less often of nuts and acorns. I have seen it cling to fresh hides hung up to dry, picking off small particles of fat and meat, and in summer it occasionally eats a few berries of different kinds. In the fall of the year it can often be seen inspecting old fence posts and telegraph poles, probably on the lookout for cocoons, spider eggs, etc. Mr. V. A. Alderson, of Marathon County, Wisconsin, publishes the following interesting statement in the "Oologist" (Vol. VII, July, 1890, p. 147): "Last summer potato bugs covered every patch of potatoes in Marathon County (being my home county), Wisconsin. One of my friends here found his patch an exception, and therefore took pains to find out the reason, and observed a Hairy Woodpecker making frequent visits to the potato field and going from there to a large pine stub a little distance away. After observing this for about six weeks, he made a visit to the pine stub, and found, on inspection, a large hole in its side, about 15 feet up. He took his ax and cut down the stub, split it open, and found inside over 2 bushels of bugs. All had their heads off and bodies intact. Now, why did the Woodpecker carry the bugs whole to the tree and only bite off and eat the heads, which could have been done in the potato field?"

Like all Woodpeckers, it is an expert climber, and moves rapidly up and around trees in short hops; it is equally easy for it to go backward or sidewise, and it is astonishing how readily it can move in any direction. The strong feet and sharp claws enable it to hold firmly to the bark, and the stiff, spiney tail feathers also come in play while it is at work, acting as a support for the body which is well thrown back when a blow is delivered with its powerful chisel-like bill. Although usually rather shy, when busy in search of food one will occasionally allow itself to be very closely approached. I have seen one alight on the trunk of a crab-apple tree within 3 feet of me and deliberately commence searching for larvæ, apparently perfectly unconcerned about my presence, and when I moved up a little closer, he simply hopped around on the opposite side of the tree and continued his search; every once in a while, however, his head would appear from behind the tree to see if I was still watching him. He remained fully thirty minutes on the same tree, where he evidently found an abundance of food, and then flew off uttering several loud notes like "huip, huip." Its ordinary call sounds like "trriii, trriii," a shrill, rattling note.

The tongue of the majority of our Woodpeckers is especially adapted for extracting larvæ, etc., from the wood in which they live. The tongue proper is

rather small, flat, and terminates in a sharp, horny point, which is armed at the sides with a series of bristle-like barbed hooks; the worm-like neck, or the hyoid process to which it is attached, is generally rather long and curves around the back of the skull in a sheath, and this can readily be thrown forward for 2 or 3 inches. A sticky saliva is also secreted, with which the tongue is covered to facilitate the extraction of the food they are in search of. Their sense of hearing must be exceedingly acute, as they appear to readily detect the slightest movement of any insect under the bark or in the solid wood, and they make no mistakes in properly locating it. Their flight is rapid, undulating, usually not very protracted, and they rarely descend to the ground in search of food, where their movements are rather awkward and clumsy. Notwithstanding the amount of labor required for the Hairy and other Woodpeckers to obtain the necessary amount of nourishment, they are usually in good condition, and in winter not unfrequently excessively fat.

Our Hairy Woodpecker is one of the earliest of this family to breed. The mating season begins in the latter part of March, and the species is at this time one of the noisiest members of this family. The male, when not in search of food, now seems to occupy himself almost exclusively with drumming on a resonant dead limb, generally situated near the top of some tall tree. The louder the noise produced, the more satisfactory it appears to be to the performer; it seems to be a sort of love note and call to the female, and, as far as I have been able to observe, is only indulged in by the male. In flying from one tree to another a shrill, sharp "huip, huip" is often uttered, and during the mating season both sexes are very demonstrative and utter quite a number of different notes. I believe this species remains paired through life. Nidification begins usually early in April, and it requires about a week to prepare the nesting site. Both sexes take part in this labor, and it is really wonderful how neat and smooth an excavation these birds can make with their chisel-shaped bills in a comparatively short time. The entrance hole is as round as if made with an auger, about 2 inches in diameter, and just large enough to admit the body of the bird; the edges are nicely beveled, the inside is equally smooth, and the cavity is gradually enlarged toward the bottom. The entrance hole, which is not unfrequently placed under a limb for protection from the weather, generally runs in straight through the solid wood for about 3 inches, and then downward from 10 to 18 inches, and some of the finer chips are allowed to remain on the bottom of the cavity in which the eggs are deposited. Both dead and living trees are selected for nesting sites, generally the former. When living trees are chosen, the inner core or heart of the tree is usually more or less decayed. These nesting sites are nearly always selected with such good judgment that such obstacles as hard knots are rarely encountered; should this occur, the site is abandoned and a fresh one selected. After this is completed the male frequently excavates another hole, or even several, in the same tree or in another close by, in which to pass the night or to seek shelter, and to be close to the nest while the female is incubating; these holes are not so deep as the others. A fresh nesting site is

generally selected each season, but where suitable trees are scarce the same one may be used for several years in succession, and in such a case it is usually thoroughly cleaned out and the old chips in the bottom removed and replaced by fresh ones. Beech, ash, poplar, birch, oak, sycamore, haw, and apple trees are mostly used for nesting sites.

Mr. D. B. Burrows writes me: "In Marshall County, Illinois, the river bottoms are subject to overflow during the spring, and high water lasts frequently for two or three months, causing the willows and soft maples to die in great numbers, sometimes leaving belts of dead trees of considerable extent. Among these the Hairy Woodpecker is always to be found. The nesting season commences earlier than that of any of the Woodpeckers found in this locality, and seems to be quite regular. From my notes I find the time to secure fresh eggs to be from the 20th to the 24th of April. Here they nest mostly in dead willows, though maple trees from which the bark has fallen off, leaving a smooth trunk, are also frequently used."

In Maine they nest sometimes in dead spruce and fir trees, but deciduous trees seem to be preferred throughout their range. In the New England States and northern New York fresh eggs are usually found during the first week in May, and ordinarily only one brood is raised in a season. In the Adirondacks their holes are often found from 40 to 50 feet from the ground. The duties of incubation are divided between the sexes and last about two weeks. The young when first hatched are repulsive-looking creatures, blind and naked, with enormously large heads, and ugly protuberances at the base of the bill, resembling a reptile more than a bird. They are totally helpless for some days, and can not stand; but they soon learn to climb. They are fed by the parents by regurgitation of their food, which is the usual way in which the young of most Woodpeckers are fed when first hatched. Later, however, a few species, like the Red-headed Woodpecker and other members of this genus, feed their young in the ordinary manner, carrying the food in their bills. The young remain in the nest about three weeks. When disturbed they utter a low, purring noise, which reminds me somewhat of that made by bees when swarming, and when a little older they utter a soft "puirr, puirr." Even after leaving the nest they are assiduously cared for by both parents for several weeks, until able to provide for themselves. Should the first set of eggs be taken, a second, and sometimes even a third, is laid at intervals of from ten to fourteen days; and if the nesting site has not been destroyed or the entrance hole enlarged (which can readily be avoided by sawing out a sufficiently large piece below the hole, enabling the collector to insert his hand, and replacing this again carefully after taking the eggs) they will frequently use it a second time.

The number of eggs laid to a set varies from three to five, usually four. I have been informed that sets of six and seven have been taken, but I doubt this. They are mostly oval in shape, sometimes elliptical oval, and occasionally rounded ovate. The shell is very finely granulated, glossy, and semitranslucent when fresh, the yolk being plainly visible then; but as incubation advances it

becomes more opaque. Like all Woodpeckers' eggs, they are pure white and unspotted.

The average measurement of twenty-nine specimens in the United States National Museum collection is 23.65 by 17.94 millimetres, or about 0.93 by 0.71 inch. The largest egg of the series measures 25 91 by 18.80 millimetres, or 1.02 by 0.74 inches; the smallest, 20.57 by 16.26 millimetres, or 0.81 by 0.64 inch.

The type specimen, No. 24721 (not figured), from a set of five eggs, was taken by Dr. William L. Ralph near Holland Patent, Oneida County, New York, on May 5, 1891.

## 17. Dryobates villosus leucomelas (Boddært).

NORTHERN HAIRY WOODPECKER

*Picus leucomelas* Boddært, Table des Planches Enluminées d'Histoire Naturelle, 1783, 21.
*Dryobates villosus leucomelas* Ridgway, Proceedings U. S. National Museum, VIII, 1885, 355.
(B 74, part; C 298, part; R 360*a*; C 438, part; U 393*a*.)

Geographical range: Northern North America; from about latitude 49° in the eastern parts of the Dominion of Canada north to about latitude 66°, and probably still farther in the interior; west to eastern Alaska; south, in winter only (?), to the northern border of the United States.

The breeding range of the Northern Hairy Woodpecker, also known as the "Great White-backed Sapsucker" and "Phillips's Woodpecker," a somewhat larger race, and usually with a greater amount of white in its plumage than the preceding, is probably coextensive with its geographical distribution; it also appears to be resident wherever found. Mr. B. R. Ross, of the Hudson Bay Company, took a male near Fort Simpson, on the Mackenzie River, in latitude 62° N., on December 29, 1860, and Mr. McQuesten obtained a female at Fort Reliance, on the upper Yukon, in Alaska, in about latitude 66° N., on September 15, 1878; both of these specimens are now in the United States National Museum. North of latitude 56° it is reported to be rare, and it is not often met with near the coast in Alaska. Prof. Winfrid A. Stearns reports taking a specimen of *Dryobates villosus* in Labrador on October 28, 1882, exact locality not stated, which is unquestionably referable to this race; but Mr. L. M. Turner, during his sojourn of several years in Ungava, failed to meet with it, and it is probably rare throughout this region. It is reported as a common resident of British Columbia, east of the Cascades, and in the Rocky Mountain sections, by Mr. John Fannin.

While stationed at Fort Custer, Montana, I took several specimens during the winter of 1884–85, which I referred to *Dryobates villosus;* one of these skins, a fine male, taken on April 19, 1885, is now in the United States National Museum collection, and this is a perfectly typical example of the northern race. It is therefore possible that it breeds in limited numbers along our northern border, but it may only have been a late straggler. I shot it in a cottonwood grove on the Big Horn River.

Its general habits, food, mode of incubation, etc., are probably the same as those of *Dryobates villosus*. There are no positively identified eggs of this race in the collection; but they undoubtedly resemble those of the preceding species, averaging probably a trifle larger.

### 18. Dryobates villosus audubonii (Swainson).

SOUTHERN HAIRY WOODPECKER.

*Picus audubonii* Swainson and Richardson, Fauna Boreali Americana, II, 1831, 306.
*Dryobates villosus audubonii* Ridgway, Proceedings U. S. National Museum, VIII, 1885, 355. (B 74, part; C 298, part; R 360, part; C 438, part; U 393*b*.)

Geographical range: South Atlantic and Gulf States; north to North Carolina, southern Tennessee, etc.; west to Louisiana and southeastern Texas. (?) Casual in the Bahamas.

The breeding range of the Southern Hairy Woodpecker, a somewhat smaller race than *Dryobates villosus*, is likewise coextensive with its geographical distribution, it generally being resident wherever found. It reaches the northern limits of its range in North Carolina. The Brimley Brothers write me that it occurs in the vicinity of Raleigh, where it is rather rare, and nests quite early, as young birds were found nearly fully fledged on May 25, 1891. Mr. William Brewster also met with it in the lowlands in Franklin County, North Carolina, and up to an elevation of 4,000 feet at Highlands, in Macon County, while Dr. W. H. Fox reports seeing a few each year in Roane County, Tennessee; specimens sent by him have been identified at the United States National Museum as referable to this subspecies. The late Mr. C. W. Beckham met with it at Bayou Sara, Louisiana, and Mr. E. A. McIlhenny found it nesting on May 12, 1892, in a cavity of a pin oak, 21 feet from the ground, in New Iberia Parish, Louisiana. Here it frequents the oak timber on high land, and is said to be rare. Although not yet reported from southeastern Texas, its range probably extends into this State also. The late Dr. W. C. Avery found it breeding in Alabama, where it is not uncommon, and Dr. William L. Ralph has taken three sets of eggs in Putnam County, Florida, which are now in the collection of the United States National Museum. Nidification commenced early in April, and several sets of eggs found by him during the last week in this month were well advanced in incubation. The cavities were in all cases excavated in cypress trees growing on the edge of swamps, and located from 28 to 45 feet from the ground. The number of eggs to a set were three or four, the first number being the more common.

The general habits, food, etc., of the Southern Hairy Woodpecker are similar to those of *Dryobates villosus*, but this subspecies seems to be more fond of fruit and berries, and the young are fed largely on figs. The eggs are scarcely distinguishable from those of the Hairy, excepting that they are a trifle narrower, and all are elliptical ovate in shape.

The average measurement of nine specimens from the Ralph collection is 23.66 by 17.40 millimetres, or about 0.93 by 0.68 inch. The largest egg measures 24.89 by 17.53 millimetres, or 0.98 by 0.69 inch; the smallest, 22.86 by 17.02 millimetres, or 0.90 by 0.67 inch.

The type specimen, No. 24182 (not figured), from a set of three eggs, was taken by Dr. William L. Ralph near San Mateo, Putnam County, Florida, on April 21, 1891.

## 19. Dryobates villosus harrisii (Audubon).

HARRIS'S WOODPECKER.

*Picus harrisii* Audubon, Ornithological Biography, V, 1839, 191.
*Dryobates villosus harrisii* Ridgway, Proceedings U. S. National Museum, VIII, 1885, 355.
(B 75, C 298*a*, R 360*b*, C 439, U 393*c*.)

Geographical range: Pacific Coast regions; from northern California (Humboldt Bay) north (near the coast only) through Oregon, Washington, and British Columbia to southern Alaska (Sitka).

Until within the last few years all the Hairy Woodpeckers from the eastern slopes of the Rocky Mountains to the Pacific coast have been considered as belonging to this subspecies, but recently Mr. William Brewster separated and described a new form in "The Auk" (Vol. V, July, 1888, p. 252), which restricts the range of the present subspecies under consideration very materially.

The breeding range of this race, as now considered, is a very limited one, and is probably coextensive with its geographical distribution. It is apparently confined to the immediate vicinity of the coast, and is not found at any great distance inland. Among the specimens collected by me at Fort Klamath, Oregon (mostly winter birds), there are two which might be called intermediates between this and the more recently separated *Dryobates villosus hyloscopus*, but the majority are clearly referable to the latter. In the typical Harris's Woodpecker the under parts are much darker, a smoky brown, in fact; it is also somewhat larger and is very readily distinguishable from the much lighter-colored and somewhat smaller Cabanis's Woodpecker. It has been taken as far north as Sitka, Alaska, and seems to be a fairly common resident near Puget Sound, Washington, from which locality I recently received a perfectly typical skin taken by Mr. S. F. Rathbun on February 14, 1892, here it breeds in the pine and fir forests. Its general habits, food, mode of nesting, etc., are similar to those of the preceding subspecies. Its eggs are probably a little larger than those of Cabanis's Woodpecker, but as there are no absolutely identified specimens in the United States National Museum collection as yet, I can not give actual measurements.

## 20. Dryobates villosus hyloscopus (Cabanis).

CABANIS'S WOODPECKER.

*Dryobates hyloscopus* Cabanis and Heine, Museum Heineanum, IV, ii, 1863, 69.
(*Dryobates villosus*) *hyloscopus* Brewster, Auk, V, July, 1888, 252 (in text).
(B 75, part; C 298*a*, part; R 360*b*, part; C 439, part; U 393*d*.)

Geographical range: Western North America; north to Montana, Idaho, and Washington, excepting the coast regions; east to the eastern slopes of the Rocky Mountains and adjacent ranges; south through California, Arizona, and New Mexico to northern Mexico and Lower California.

Cabanis's Woodpecker is generally intermediate in size between *Dryobates villosus* and *Dryobates villosus leucomelas*, and is distinguishable from the former by its plain black or much less spotted wing coverts and tertials, and from *Dryobates villosus harrisii* by its lighter-colored under parts and somewhat smaller size. I have recently had an opportunity to examine several skins of this subspecies, taken in the vicinity of Fort Sherman, Idaho, by Dr. James C. Merrill, United States Army, which are almost as large as *Dryobates villosus leucomelas* and fully as large as *Dryobates villosus harrisii*. It is practically a resident wherever found, and its breeding range is coextensive with its geographical distribution. In winter it is often met with in the valleys adjacent to mountain ranges, to which it retires in summer to breed; but these vertical migrations, if they may be called so, are never very extended.

Cabanis's Woodpecker does not appear to be found north of our border, and has not as yet been reported from any point in the Dominion of Canada, nor does it reach any great distance beyond the eastern slopes of the Rocky Mountains and adjacent ranges. Dr. G. S. Agersborg gives it as a common resident of southeastern South Dakota, but I doubt if perfectly typical specimens of this race are found east of the Black Hills in this State. It inhabits all the mountain regions of the interior up to altitudes of 10,000 feet, and occurs also south of our border in northern Mexico. In southern Arizona it does not appear to breed in the lower valleys, but I have shot several near Tucson in winter, and it merely retires to the neighboring mountains here, where it finds a suitable summer climate during the season of reproduction. Mr. A. W. Anthony observed it in the San Pedro Martir Mountains, Lower California, at altitudes from 7,000 to 10,000 feet. Mr. Denis Gale found it breeding in Boulder County, Colorado, on May 28, 1886, in a live aspen tree, at an altitude of about 8,500 feet. The nest contained five eggs, in which incubation was somewhat advanced. Mr. William G. Smith also reports it as common in Colorado, coming down into the valleys in winter. He says it is the earliest of the Woodpeckers to breed, that it commences nesting in the latter part of April, and usually excavates its holes in old dead pines, frequently at a considerable distance from the ground, and that he has seen full-grown young by June 1.

In California Cabanis' Woodpecker is common in the mountains, but in the lowlands in the southern parts of this State Mr. F. Stephens considers it a

rather rare summer resident. He found it breeding in a cottonwood tree, near San Bernardino, on March 29, 1885. Mr. Lyman Belding took several nests of this subspecies in Calaveras County, in the Sierra Nevadas; in one, found on June 6, 1879, which had been excavated in a dead pine stump, 12 feet from the ground, the eggs, three in number, were on the point of hatching. In his notes he says: "I scared the female from it and prevented her return by inserting a stick, the end of which protruded for several feet. When she found she could not enter she gave several cries, which brought the male, who hopped up and down the stick a few times, striking it with his bill and screaming angrily, pausing occasionally, and apparently deliberating on the best method of extracting it." Another nest, found by him on July 10, 1880, was located only 3 feet from the ground, and contained young which were still in the nest on the 20th. Mr. Charles A. Allen informs me that along the Sacramento River, in California, it breeds in sycamores and willows, but that it is not common there.

I have met with Cabanis's Woodpecker in most of our Northwestern States, but found it nowhere very common. I took my first nest near Camp Harney, Oregon, on May 29, 1875, in a canyon on the southern slopes of the Blue Mountains, at an altitude of about 5,000 feet. The cavity was excavated in the main trunk of a nearly dead aspen, about 12 feet from the ground. The entrance hole was about $1\frac{3}{4}$ inches in diameter, and the cavity about 9 inches deep. It contained four much incubated eggs. The female was in the hole, and stayed there looking out until I had struck the tree several times with a hatchet, when she flew off and alighted on one of the limbs of the tree, uttering cries of distress, which brought the male, who was still more demonstrative, hopping from limb to limb, squealing and scolding at me and pecking at the limbs on which he perched. At Fort Klamath, Oregon, it was somewhat more common, and here I took several of its nests. It appears to be especially abundant in tracts in which the timber has been killed by fire, and where many of the slowly rotting trunks still remain standing. Such burnings are frequently met with in the mountains, and seem to attract several species of Woodpeckers, presumably on account of the abundance of suitable food to be found. Full sets of eggs may be looked for in ordinary seasons during the first ten days in May, and occasionally even earlier, as I found a nest with four young, several days old, on May 21, 1883. Inasmuch as this Woodpecker nests rather early, it is possible that two broods are raised in a season. Dead or badly decayed trees are preferred to live ones for nesting purposes, and deciduous trees to conifers; it also nests occasionally in firs and madrone trees.

Like the Hairy Woodpecker, Cabanis's is very noisy, especially in the early spring. It likewise is a great drummer, and utters a variety of notes, some of which sound like "kick-kick, whitoo, whitoo, whit-whit, wi-wi-wi-wi," and a hoarse gutteral one, somewhat like "kheak-kheak" or "khack-khack." It is one of our most active Woodpeckers, always busy searching for food, which consists principally of injurious larvæ and eggs of insects, varied occasionally with a diet of small berries and seeds, and in winter sometimes of piñon nuts, pine seeds, and

acorns. At this season I have often seen this species around slaughter houses, picking up stray bits of meat or fat, and have also seen it pecking at haunches of venison hung up in the open air. It is a rather unsocial bird at all times, and it is rare to see more than a pair together, excepting when still caring for their young to which they appear to be very devoted for some time after these have left their nests.

Its nesting habits are entirely similar to those of *Dryobates villosus;* both sexes share the work in excavating the nesting site, as well as the duty of incubation, which lasts about fifteen days. Their holes are usually located from 12 to 18 feet from the ground, and occasionally as low as 3 feet, or again in the dead top of a tall pine, fully 50 feet up, and it breeds earlier than any other Woodpecker found in the same localities. The number of eggs laid to a set varies from three to six; those of four are by far the most common; sets of five are only occasionally met with, while sets of six are very unusual. Mr. Denis Gale has taken a set of six, and I also found one. The eggs lie on the fine chips left in the bottom of the cavity, and are occasionally well packed into these, so that only about one-half of the egg is visible. They resemble the eggs of *Dryobates villosus* in color, but those of an elliptical ovate shape are more common than the oval and elliptical ovals, averaging, therefore, more in length, while there is proportionably less difference in their short diameter.

The average measurements of forty-four specimens in the United States National Museum collection is 24.95 by 18.49 millimetres, or about 0.98 by 0.73 inch. The largest egg of the series measures 26.16 by 18.80 millimetres, or 1.03 by 0.74 inches; the smallest, 23.37 by 17.78 millimetres, or 0.92 by 0.70 inch.

The type specimen, No. 19422 (not figured), from a set of three eggs, Bendire collection, was taken by the writer in the Blue Mountains, near Camp Harney, Oregon, on May 29, 1875.

## 21. Dryobates pubescens (Linnæus).

DOWNY WOODPECKER.

*Picus pubescens* Linnæus, Systema Naturæ, ed. 12, I, 1766, 175.
*D[ryobates] pubescens* Cabanis, Museum Heineanum, IV, June 15, 1863, 62.
(B 76, C 299, R 361, C 440, U 394.)

Geographical range: Eastern and northern North America; from Florida and the Gulf States north through the Dominion of Canada, in southern Labrador, to about latitude 55° N.; thence in a northwesterly direction through the Northeast Territory, Keewatin, and the Northwest Territory to northern Alaska, to about latitude 66° N.; west to Manitoba, North and South Dakota, Nebraska, Kansas, the Indian Territory, and eastern Texas. Irregularly to Montana, Colorado, Idaho, Oregon, Washington, and California. Accidental in England.

The Downy Woodpecker, also known as the "Little Sapsucker" and "Little Guinea Woodpecker," is the smallest of our *Picidæ*, closely resembling a Hairy Woodpecker in coloration, but much smaller. Like it, it is an extremely hardy

bird, and is equally at home in the boreal regions or in semitropical Florida. Its breeding range is an extensive one and corresponds with its geographical distribution. Although of a more or less roving disposition in winter, in certain localities throughout its range, caused probably by abundance or lack of food, it can not be considered as a strictly migratory bird, as it appears to be a resident even in winter in northern Alaska, a fact that is well attested from the numerous specimens taken there at that season and now in the United States National Museum collection.

I notice that the under parts of all the Alaskan specimens and others from the far north are much lighter colored than birds from the southern parts of its range, they also generally average somewhat larger, and if *Dryobates villosus leucomelas* is considered a good race, our northern Downy Woodpecker would appear to me to be equally well entitled to subspecific rank. I took a single specimen of this northern form, a male, near Fort Custer, Montana, on January 28, 1885, which is identical with the birds found in Alaska, probably a straggler from the far north. I have also seen a perfectly typical specimen of this species, a female, taken by Mr. S. F. Rathbun, near Seattle, Washington, on February 20, 1892.

The Downy Woodpecker is more sociable and confiding in man than the Hairy Woodpecker; it likes to take up its home in the vicinity of human habitations, and I believe throughout the eastern United States it is more abundant than its larger relative. Unfortunately, it is also considered a Sapsucker, and many of these exceedingly useful little Woodpeckers are killed yearly through lamentable ignorance, under the supposition that they injure the fruit trees by boring in the bark, while in fact they render the horticulturist inestimable service by ridding his orchard of innumerable injurious insects, their eggs and larvæ, and few of our native birds deserve our good will more than the little Downy Woodpecker. The most stringent protection is none too good for it. It is one of the most industrious of birds, is always at work hunting for food, and the number of injurious beetles and their larvæ, caterpillars, etc., destroyed by a single bird in the course of a season must be enormous. Aside from such a diet, it feeds also on ants and their larvæ, spiders and their eggs, and more rarely on small grains, berries, and nuts. It does not object to raw meat, and if a piece is hung up in winter where it can readily get at it, it will pay it regular visits as long as it lasts. It is partial to rather open and cultivated country, interspersed here and there with small woods and orchards; and to the scattering trees and shrubbery of river and creek bottoms, the shade trees along country roads, and along the edges of clearings, and it is even at home in villages. It especially loves to feed in orchards, and also in alders and white birch trees. It begins near the roots and carefully scans every cranny as it hops along, looking now on one side and then on the other, and no lurking insect seems to escape its sharp eye. It is less often met with in the more extensive forests, excepting along water courses, and it does not seem to care much for burnt tracts, which have so much attraction for the Hairy and other Woodpeckers. Although not particularly sociable to its own kind, it loves to be in company with other smaller insect-

ivorous birds, such as Chickadees, Nuthatches, and others, especially in winter. It is not as noisy a bird as the majority of Woodpeckers, and utters but few notes, excepting during the mating season when two or three males are in pursuit of a female. While searching for food it utters occasionally a low "pshir, pshir." One of its common call notes sounds like "pwit, pwit," terminating with "tchee, tchee, tchee," rapidly repeated. Another note, uttered when a pair are chasing one another, reminds me somewhat of the "kick-kick" of the Flicker, but is not uttered quite as loudly. In the early spring the male frequently amuses himself by persistently drumming on some resonant dry limb, often for fifteen minutes at a time, to attract the attention of his mate, or as a challenge to some rival, but later in the season this is less frequently heard. It is exceedingly graceful in all its movements on a tree trunk, moving up or down as well as sidewise with equal facility, and I have seen it hanging perfectly motionless for minutes at a time in the same position, apparently as if in deep thought. While at Holland Patent, New York, during the summer of 1893, I had excellent opportunities to watch these interesting birds; a pair had raised a brood in a dead limb of a maple tree in the public square of the village, and one or more could be seen about at almost any hour of the day, and I have more than once walked up to within 3 feet of one. As they had never been molested, they were tame, and allowed themselves to be closely approached. The young of the year were, apparently, much more suspicious than the old birds.

In the more southern portions of its range, as in Florida, nidification usually begins about the middle of April; in New England and along our northern border, from four to five weeks later, and in Alaska rarely before June 1. Apple, pear, cherry, oak, maple, poplar, alder, American linden or basswood, ash, willow, and magnolia trees appear to furnish its favorite nesting sites, and it prefers to dig out a home in some dead limb, or in the dead top of the trunk, but it also nests in live trees, usually selecting those in which the core shows signs of decay. In Florida slender dead saplings are preferred. The entrance hole is just about large enough to admit the body of the bird with somewhat of an effort, perfectly circular, measuring about 1½ inches in diameter. The inner cavity is gradually enlarged toward the bottom, where it is about 3 inches wide, and the sides are chipped smooth; the hole is usually from 6 to 9 inches in depth, and the bottom is covered with a layer of fine chips on which the eggs are deposited. Both sexes assist in this work, and it takes about a week to complete a suitable excavation. After it is finished the male frequently digs out a somewhat shallower one for himself in the same tree, or in another close by. A new site is usually selected each season in the vicinity of the old one, but occasionally this is cleaned out, deepened a little, and used for several years in succession. Each pair of birds lay claim to a certain range, and intruders on this are driven away.

The Downy Woodpecker, although small in size, does not lack for courage. Mr. J. W. Preston writes me: "On May 15, 1891, a female Downy was attracted from her nest in a decaying branch of a weeping willow near our house by a Red-headed Woodpecker, which was tapping on the tree trunk. It at once

attacked the larger intruder fearlessly, and several times she darted at its head without frightening it away, and at last the defense became so spirited that the Red-head seized the little one by the wing, tearing a secondary therefrom, and flew off with its trophy."

The number of eggs laid to a set varies from three to six, sets of four or five being most commonly found; one egg is deposited daily. In the north, as a rule, only a single brood is raised in a season; in the more southern parts of its range it probably raises two. If the first set of eggs are taken, and the entrance hole has not been enlarged, it will often lay a second set in the same cavity, and occasionally a third set. Incubation lasts about twelve days, and the male performs his full share of this duty. The young are diligently cared for, for some time after leaving the nest, and when able to provide for themselves each goes its own way. In the winter they dig shallower excavations in dead trees, old stumps, or fence posts in some sheltered situation, in which they spend the nights, and to which they retire during stormy weather. In Florida full sets of fresh eggs may be looked for during the last week in April, and in our Northern States about a month later. The nesting sites vary from 5 up to 50 feet. There is considerable variation in the size of the eggs of this species; like those of all Woodpeckers, they are glossy white in color, and mostly ovate and rounded ovate in shape.

The average measurement of sixty specimens in the United States National Museum collection is 19.40 by 15.08 millimetres, or about 0.76 by 0.59 inch. The largest egg of the series measures 22.35 by 16.26 millimetres, or 0.88 by 0.64 inch; the smallest, 17.78 by 13.46 millimetres, or 0.70 by 0.53 inch. The set to which the smallest egg belongs was taken by Dr. William L. Ralph, in Putnam County, Florida, and one of the five eggs it contained is figured. The cavity was excavated in the dead top of a magnolia tree standing in an open field near woods, 48 feet from the ground.

The type specimen, No. 25594 (Pl. 1, Fig. 24), from a set of five eggs, Ralph collection, was taken as stated above, on April 30, 1892, and represents one of the smallest eggs of the series.

## 22. Dryobates pubescens gairdnerii (Audubon).

GAIRDNER'S WOODPECKER.

*Picus gairdnerii* Audubon, Ornithological Biography, V, 1839, 317.
*Dryobates pubescens gairdnerii* Ridgway, Proceeding U. S. National Museum, VIII, 1885, 355.
(B 77, C 299*a*, R 361*a*, C 441, U 394*a*.)

Geographical range: Western North America; from southern California north through Oregon and Washington into British Columbia, to about latitude 55°, and possibly farther north; east to the eastern slopes of the Sierra Nevada and Cascade ranges and somewhat beyond.

Gairdner's Woodpecker, the western representative of the Downy, is principally distinguishable from it by having the middle and greater wing coverts plain black, or only slightly spotted with white. Its range is apparently rather

restricted, and seems to be mainly confined to that part of California west of the Sierra Nevadas. Mr. E. W. Nelson reports it as rare in the piñon belt of the Panamint and Grapevine mountains during Dr. C. Hart Merriam's explorations in the Death Valley region, in the southeastern parts of this State, in 1891. In Oregon and Washington it probably does not reach very far beyond the eastern slopes of the Cascades, while in central British Columbia it is known to occur as far north as Lake Babine, in about latitude 55°. Among a collection of birds and eggs sent by Mr. R. MacFarlane from Fort St. James was a single skin of this subspecies taken in June, 1889.

Gairdner's Woodpecker is more or less a resident and probably breeds wherever found. It is said to be rather common in parts of northern California and in Oregon, but I found it somewhat rare everywhere in the west. It occurs in small numbers about Fort Klamath, Oregon, where I took a set of four slightly incubated eggs, near the Indian Agency, in a dead aspen sapling, on June 9, 1883. The cavity was about 8 inches deep and situated 15 feet from the ground. All of the Klamath birds are typical, and fully as dark underneath as any from the coast. I also met with this or the lately described Batchelder's Woodpecker near Fort Walla Walla, Washington, and on the John Day River, Oregon, but it was of rare occurrence in both localities, and seemed to be confined to the willows near streams. Mr. Rollo H. Beck, of Berryessa, California, writes me that it is a fairly common resident there, and is principally found along the water courses of the foothills, and only occasionally along the creeks and streams in the valleys. Mr. Charles A. Allen informs me that it breeds in the oaks and willows along the Sacramento River, California, but that it is not common. Its breeding sites seem to be confined to deciduous trees, preferably dead ones, or old stumps, and besides these already mentioned, sycamore and cottonwoods are occasionally used. Their nesting sites are rarely found at any great distance from the ground, usually ranging from 4 to 20 feet up and rarely higher.

Its general habits, food, call notes, mode of nidification, etc., are similar to those of the Downy Woodpecker, and the same description will answer for both. As California is a great fruit-growing State, Gairdner's Woodpecker should be especially protected for the good work it does by ridding the orchards of noxious insects and their larvæ. In southern California nidification begins sometimes as early as the middle of April, while farther north it is several weeks later; four or five eggs are usually laid to a set, and one is deposited daily. Ordinarily but one brood is raised in a season. The eggs of Gairdner's Woodpecker resemble those of the Downy in every respect, but average a trifle smaller.

The average measurement of thirty-four specimens in the United States National Museum collection is 18.80 by 14.22 millimetres, or 0.74 by 0.56 inch. The largest egg of the series measures 20.32 by 16 millimetres, or 0.80 by 0.63 inch; the smallest, 17.53 by 13.21 millimetres, or 0.69 by 0.52 inch.

The type specimen, No. 19433 (not figured), from a set of four eggs, Bendire collection, was taken by the writer near Fort Klamath, Oregon, on June 9, 1883.

## 23. Dryobates pubescens orecœcus Batchelder.

BATCHELDER'S WOODPECKER.

*Dryobates pubescens orecœcus* Batchelder, Auk, VI, July, 1889, 253.
(B 77, part; C 299*a*, part; R 361*a*, part; C 441, part; U 394*b*.)

Geographical range: Rocky Mountains and adjacent mountain regions from Arizona and New Mexico north through Colorado, Wyoming, and Montana, probably to the southern parts of eastern British Columbia and western Alberta, in the Dominion of Canada; west through Utah and southeastern Idaho to Nevada. Casually to southern California.

Batchelder's Woodpecker, recently separated from Gairdner's by Mr. C. F. Batchelder, whose name it bears, is distinguishable from the preceding subspecies by having the under parts pure white instead of smoky brown; the white areas are generally more extended, and the under tail coverts are immaculate instead of being spotted or barred with black. It is also somewhat larger. Like the former, it is distinguishable from *Dryobates pubescens* by the absence or scarcity of the white markings on the wing coverts. The geographical and breeding range of Batchelder's Woodpecker is as yet but very indefinitely ascertained. Dr. Edgar A. Mearns, United States Army, reports it as breeding sparingly through the *Pinus ponderosa* belt, ascending into the Spruce zone, on the San Francisco cone, and considers it the rarest of the Woodpeckers found in Arizona. Mr. Denis Gale took a nest and eggs of this subspecies in Boulder County, Colorado, on June 12, 1889. The excavation was found in a half-dead aspen, 30 feet from the ground, and presumably well up in the mountains, as Mr. William G. Smith informs me that it is only a winter visitor in the lower valleys, and is never seen there during warm weather. I found it rare near Fort Custer, Montana, and only obtained a single male specimen, on November 23, 1884, among the willows and cottonwoods on the Little Horn River. Dr. James C. Merrill, United States Army, met with it breeding at Fort Shaw, Montana, early in June, 1879, and tells me that five or six eggs are generally laid to a set, and that the nesting habits are just like those of the Downy Woodpecker. Among some skins recently sent me for examination by the Doctor, from Fort Sherman, Idaho, taken during the winter of 1894 and 1895, are four specimens which certainly can not be referred to either Batchelder's or Gairdner's Woodpeckers; neither can they be called typical "*Dryobates pubescens*," but two of the specimens come much nearer the latter than to the other two subspecies, the under tail coverts in all of them being distinctly spotted. I am at a loss where to place them, and it will require a larger series of skins to determine their proper status. Dr. C. Hart Merriam saw a small Woodpecker among some burnt timber in the upper part of Wood River Valley, Idaho, which, in all probability, was referable to this subspecies. The United States National Museum collection also contains specimens from the Bitter Root Valley, Montana; the upper Humboldt Valley, in Nevada; from the head waters of the Cheyenne River, and from Laramie, Wyoming; and it appears to be more common on the

eastern slopes of the Rocky Mountains than on the western and through the Great Basin regions. It undoubtedly is also found in the Rocky Mountain regions of southern British Columbia and the Province of Alberta. Its general habits, food, etc., resemble those of the two preceding subspecies in every way. The eggs are also similar.

The average measurement of eleven specimens is 19.05 by 15.24 millimetres, or 0.75 by 0.60 inch. The largest egg measures 19.81 by 15.24 millimetres, or 0.78 by 0.60 inch; the smallest, 17.53 by 14.99 millimetres, or 0.69 by 0.59 inch.

The type specimen, No. 21945 (not figured), from a set of four eggs, was taken by Dr. James C. Merrill, United States Army, near Fort Shaw, Montana, on June 12, 1879.

## 24. Dryobates borealis (Vieillot).

RED-COCKADED WOODPECKER.

*Picus borealis* Vieillot, Oiseaux Amerique Septentrionale, II, 1807, 66.
*Dryobates borealis* Ridgway, Proceedings U. S. National Museum, VIII, 1885, 355.
(B 80, C 296, R 362, C 433, U 395.)

Geographical range: Southeastern United States; north to North Carolina, Tennessee, Arkansas, and the Indian Territory; west to eastern Texas. Casually to New Jersey, Pennsylvania, and Kentucky.

The Red-cockaded Woodpecker, a common resident of our South Atlantic and Gulf States, is particularly abundant in the pine forests of South Carolina, Georgia, and Florida. In the northern half of North Carolina it is rather rare, but it probably breeds in the vicinity of Raleigh, as Mr. H. H. Brimley shot a female there in pine woods on April 22, 1891. There are also several specimens in the United States National Museum collection from Roane County, Tennessee; it has likewise been reported from Newport, in northeastern Arkansas, and from the Indian Territory; these points probably mark the northern limits of its breeding range. Mr. Henry Nehrling found it not uncommon in the flat, sandy pine woods in southeastern Texas, which marks the western limits of its known range.

The majority of observers state that it is strictly a bird of the pines, and that it breeds only in trees of that kind, while Mr. Nehrling says that it usually excavates its nesting sites in deciduous trees, and Mr. E. A. McIlhenny writes me that in southern Louisiana it generally nests in willow and china trees. The Red-cockaded Woodpecker is reported to be one of the noisiest members of this family, but at the same time more sociable in disposition than other species. Its call notes are said to be uttered in a rather petulant manner, and Alexander Wilson compares them to the querulous cries of young birds. Its food, like that of all our Woodpeckers, consists mainly of small insects and their larvæ, cocoons, and spiders, and, in summer, to some extent of berries and fruits. Mr. E. A. McIlhenny writes that in southern Louisiana the fig crop ripens during their breeding season, and that the young are fed to a considerable

extent on them, the parent taking the stem of a fig in its beak and carrying it entire to the nest. Audubon mentions poke and smilax berries, grapes, and pine flowers as being eaten by them.

In Florida, South Carolina, and Louisiana nidification commences rather early, sometimes in February; but full sets of eggs are rarely found before the last week in April, and the majority of these birds commence laying about May 1. Mr. Arthur T. Wayne writes me from Mount Pleasant, South Carolina, on this subject as follows: "The Red-cockaded Woodpecker prefers the long-leaf pine to breed in, but I have also found the nest in the short-leaf species. In this vicinity the hole is invariable excavated in a live pine, and sometimes as many as six holes are found in a single tree. It never lays until the gum pours freely from the tree it nests in, and to hasten its flow the birds dig into the tree on all sides, above and below the hole. The height of its nesting site varies from 20 to 70 feet."

Trees in which the heart is diseased are usually selected for such a purpose, and the cavity is excavated in the main trunk of the tree, ordinarily from 25 to 35 feet from the ground. The entrance-hole, which is about 2 inches in diameter, frequently passes through 6 inches of solid wood before it reaches the somewhat softer decayed inner parts of the tree, and the nesting cavity, which is gradually enlarged toward the bottom, varies from 6 to 10 inches in depth by about $3\frac{1}{2}$ inches in diameter. Both sexes assist in this labor, as well as in incubation, which lasts about fourteen days. Ordinarily only one brood is raised in a season, but from the fact that Mr. Henry Nehrling found young in July which had only recently left the nest, it is possible that a second brood is occasionally reared. Dr. William L. Ralph tells me that this species is quite common in the low, flat pine woods in Putnum County, Florida, where he has found several of its nests. All of these were excavated in the trunks of live pine trees, and it took considerable labor to get at the eggs; these are three or four in number, rarely more. The eggs of this Woodpecker are pure glossy white, and mostly elliptical ovate in shape. The shell is moderately strong, close grained, and semitranslucent when fresh.

The average measurement of twenty-three specimens in the United States National Museum collection is 24.07 by 17.46 millimetres, or about 0.95 by 0.69 inch. The largest egg measures 26.42 by 18.54 millimetres, or 1.04 by 0.73 inches; the smallest, 22.10 by 17.27 millimetres, or 0.87 by 0.68 inch.

The type specimen, No. 24724 (not figured), from a set of four eggs, was taken by Dr. William L. Ralph on May 9, 1891, near San Mateo, Putnam County, Florida.

## 25. Dryobates scalaris bairdi (Sclater).

BAIRD'S WOODPECKER.

*Picus bairdi* (Sclater's MSS.) Malherbe, Monograph of the Picidæ, I, 1861, 118, Pl. 27.
*Dryobates scalaris bairdi* Ridgway, Manual of North American Birds, 1887, p. 285.
(B 79, C 297, R 363, C 434, U 396.)

Geographical range: Northern Mexico and southern border of the United States, from Texas through southern New Mexico and Arizona to southeastern California; north to southern Nevada and southwestern Utah.

Baird's Woodpecker, also known as "Texan Sapsucker" and "Ladder-backed Woodpecker," is generally resident and breeds wherever found. It attains about the northern limits of its range in southwestern Utah, where Dr. C. Hart Merriam met with it near the mouth of the Santa Clara River; he also observed it at Upper Cottonwood Springs, at the eastern base of the Charleston Mountains, Nevada, and an adult male was taken by him on Beaverdam River, in northwestern Arizona, on May 9, 1891. This extends its northern range to about latitude 37°. In Texas and New Mexico it is rarely met with north of latitude 34°. The western limits of its range are found in southeastern California, in San Bernardino County. Mr. F. Stephens, who is well known as an accurate observer, writes me on this subject: "I have taken Baird's Woodpecker, mated, in April, in the eastern end of the San Gorgonio Pass, in San Bernardino County, California, and also at other times and places in the Colorado desert, where it is not as common, however, as Nuttall's Woodpecker." Dr. A. K. Fisher took two specimens on January 4 and 5, 1891, at Hesperia, in the same county. The eastern limit of its range appears to be found in southeastern Texas, where Mr. Henry Nehrling reports it as common in all the wooded districts of Harris, Montgomery, Galveston, and Fort Bend counties, and from our present knowledge it appears to occur throughout the greater part of this State, excepting the northern and northeastern portions. Baird's Woodpecker is but a trifle larger than the Downy, and its habits, call notes, food, etc., are very similar. It prefers the lowlands and river bottoms to the uplands, and it is rarely found at altitudes above 4,000 feet. I found it common in the mesquite groves on the Santa Cruz River, between Tucson and the Papago Mission Church, Arizona, and much less so among the cottonwoods and willows on Rillito Creek. In Arizona it is also met with in the oak belt, but apparently not in the pines.

Mr. W. E. D. Scott states: "I have frequently met with Baird's Woodpecker in the Cholla region in Arizona, digging in the ground at the roots of a cactus. They are at times gregarious. I particularly noticed this in December, 1885, when I often met with this species in flocks of from four to a dozen on the plains at an altitude of 3,000 feet. I have found the species breeding in May at an altitude of 3,500 feet. On May 27, 1884, I found a nest in a mesquite tree, which contained five eggs nearly ready to hatch; the opening to the nest was 14 feet from the ground."[1]

[1] The Auk, Vol. III, 1886, p. 426.

Baird's Woodpecker, like several other species, is very fond of the ripe fig-like fruit of the giant cactus, and I have met it more than once in Sahuarito Pass, Arizona, eating it on the ground. It nests by preference in mesquite trees, one of our hardest woods, and it must require a long time to chisel out a nesting site in one of these trees. While it is true that the heart is usually more or less decayed, the birds have first to work through an inch or two of solid wood which is almost impervious to a sharp ax. Dr. James C. Merrill, United States Army, reports Baird's Woodpecker as a common resident in the vicinity of Fort Brown, Texas, and that he took several sets of its eggs there; it was also met with by Mr. G. B. Sennett near Hidalgo, Texas, where a nest was found on April 29 containing three young birds and a sterile egg. In Texas it has also been found nesting in hackberry and china trees, as well as in telegraph poles and fence posts. In southern New Mexico and Arizona it nests sometimes in the flowering stems of the agave plant and also in yucca trees, and I have found it nesting on Rillito Creek, Arizona, in a small dead willow sapling not over 3½ inches in diameter. The cavity was about 12 feet from the ground and 10 inches in depth, and the entrance hole a trifle over 1½ inches in diameter. This nest was found on June 8, 1872, and contained only two eggs, in which incubation was about one-half advanced; the eggs laid on fine chips. The nesting sites are placed at various distances from the ground, from 3 to 30, usually from 6 to 14 feet. Dead branches of trees or partly decayed ones seem to be preferred to live ones.

From two to five eggs are laid to a set, usually four or five, and incubation, in which both sexes assist, lasts about thirteen days. In the lower Rio Grande Valley full sets of fresh eggs are sometimes found by the middle of April, but throughout the greater part of its range not until the first week in May. I believe one brood only is raised, as a rule, in a season; but, as fresh eggs are sometimes found as late as July, it is probable that a second brood is occasionally reared. The eggs of Baird's Woodpecker are glossy white in color, fine grained, and mostly oval or elliptical oval in shape, varying occasionally to elliptical ovate.

The average measurement of fifty-seven specimens, mostly from the Ralph collection and taken in the lower Rio Grande Valley, is 20.74 by 15.92 millimetres, or about 0.82 by 0.63 inch. The largest egg of the series measures 22.10 by 16.76 millimetres, or 0.87 by 0.66 inch; the smallest, 17.27 by 15.49 millimetres, or 0.68 by 0.61 inch, and a runt in the collection measures only 14.48 by 11.43 millimetres, or 0.57 by 0.45 inch.

The type specimen, No. 20904 (not figured), from a set of four eggs, was taken by Dr. James C. Merrill, United States Army, near Fort Brown, Texas, on May 23, 1877.

## 26. Dryobates scalaris lucasanus (Xantus).

ST. LUCAS WOODPECKER.

*Picus lucasanus* Xantus, Proceedings Academy Natural Sciences, Philadelphia, 1859, 298.
*Dryobates scalaris lucasanus* Ridgway, Proceedings U. S. National Museum, VIII, 1885, 355.
(B —, C 297*b*, R 363*a*, C 436, U 396*a*.)

Geographical range: Lower California; casual (?) in southern California.

The St. Lucas Woodpecker, a closely allied race to Baird's Woodpecker, is a common resident in the southern portions of the peninsula of Lower California, where it was discovered by Mr. J. Xantus, near Cape St. Lucas, and described in the "Proceedings of the Academy of Natural Sciences in Philadelphia, Pennsylvania, in 1859." Mr. Walter E. Bryant, in his "Catalogue of the Birds of Lower California," makes the following remarks about this subspecies: "I first met with this Woodpecker on Santa Margarita Island, and afterwards collected specimens as far north as latitude 28°; Mr. Belding found it very common at the Cape region, but rarely saw any in the Victoria Mountains."[1]

Mr. A. W. Anthony took a specimen at San Telmo, Lower California, on April 30, 1893, and saw others there, and Mr. W. W. Price took another on April 29, 1889, at White Water, San Diego County, California, which extends the range of this subspecies considerably to the northward.

Mr. Gerritt S. Miller, jr., of Cambridge, Massachusetts, who records the capture of the above specimen, which is now in his collection, says in referring to it: "Mr. Price writes me that the specimen was shot from a telegraph pole about 3 miles west of the station of White Water. Woodpeckers, apparently of the same kind, were seen on several other occasions on the telegraph poles along the line of the Southern Pacific Railroad, near White Water, but they were very shy and no more could be killed. The birds were nesting in the telegraph poles, there being no other wood in the region."[2]

The eggs of the St. Lucas Woodpecker I believe remain still undescribed, but are probably indistinguishable from those of the preceding subspecies, and its general habits also appear to be very similar.

## 27. Dryobates nuttallii (Gambel).

NUTTALL'S WOODPECKER.

*Picus nuttallii* Gambel, Proceedings Academy Natural Sciences, Philadelphia, April, 1843, 259.
*Dryobates nuttallii* Ridgway, Proceedings U. S. National Museum, VIII, 1885, 355.
(B 78, C 297*a*, R 364, C 435, U 397.)

Geographical range: Northern Lower California from the San Pedro Martir Mountains, north through California to southern Oregon (Umpqua Valley), west of the Sierra Nevada and Cascade Mountains.

Nuttall's Woodpecker, which is about the same size as the Texan Woodpecker, is an inhabitant of the lower foothill regions throughout its range, and is

[1] Proceedings of the California Academy of Sciences, 2d series, Vol. II, 1889, p. 286.
[2] The Auk, Vol. XI, 1894, p. 178.

most common in the oak belt and the deciduous trees along water courses, rarely being met with among the conifers. It is a resident and breeds throughout the greater portion of California west of the Sierra Nevadas, but is nowhere especially common. In southern Oregon it appears to be rare, and the only specimens recorded from this State are the one taken by Dr. J. S. Newberry in the Umpqua Valley, which is in the United States National Museum, but has no date on the label, and another taken near Ashland, now in the collection of the United States Department of Agriculture, Washington, D. C. It is apparently more abundant in southern California than elsewhere. Mr. F. Stephens reports it there as a common resident below the pine region, in which it occurs but sparingly. Mr. Charles A. Allen writes me: "It breeds among the oak groves and perhaps among the willows along the Sacramento River, but I never found it far away from the oaks. Its habits are similar to those of Gairdner's Woodpecker, but its notes are quite different—so much so as to be appreciated even by a novice."

Mr. H. W. Henshaw describes the call of Nuttall's Woodpecker as consisting of a series of loud rattling notes, much prolonged, and says: "They can not be compared with those of any other Woodpecker with which I am acquainted." He further states: "This Woodpecker is a bird particularly of the oak groves, and ranges from the lower valleys of the mountains to a height of at least 6,000 feet, where, near Fort Tejon, I found it fairly numerous among the pines, this being the only locality where I found it among the conifers."[1]

Mr. A. W. Anthony, in his list of "Birds of San Pedro Martir, Lower California," published in "Zoe" (Vol. IV, p. 236), says: "Common along all the timbered streams as high as 4,000 feet, or the limit of the live oaks and sycamores."

Mr. Rollo H. Beck, of Berryessa, California, writes me as follows: "Nuttall's Woodpecker is a fairly common resident in the mountains to the east of Santa Clara County. It seems to prefer the oak trees to other kinds, climbing up and down the limbs, much the same as Gairdner's does, in the search for grubs and insects. On May 13, 1892, I found a female digging a cavity for a nest on the under side of a dead oak limb, about 24 feet from the ground; the cavity was about 8 inches deep and not yet completed. Next day, while walking down a small gulch, I saw a female fly from a hole in a sycamore limb, which had been split off from the main trunk and lodged on a limb of another tree close by. The under side of the limb was dead, but the upper part was still living. Red-shafted Flickers had dug several holes in the same limb, and one of these contained eggs. I procured a rope and returned to this tree about four hours later, and when I had climbed to within 4 feet of the nest the female flew off. On examination I found that the nest contained young, just hatched; both parents remained close by and uttered notes of protest until I left. They appear to be partial to gulches, where white and live oak trees are numerous, and I have not noticed any in the valleys, among the willows along streams, where Gairdner's Woodpeckers are common."

[1] Geographical Surveys West of the 100th Meridian, 1876, p. 258.

Mr. B. T. Gault published an interesting article on Nuttall's Woodpecker in "Bulletin II, Ridgway Ornithological Club," April, 1887 (pp. 78–81), from which I extract the following: "Although I have been as far south as San Diego, California, and as far north as the Russian River, Sonoma County, stopping at intermediate points, I have observed this bird at but one locality. This assertion, however, may not cut any figure, for my stops were necessarily short in some places. The region I refer to lies at the upper end of the San Bernardino Valley and back from the coast about 50 miles. It is near a ranche known as 'Crafton Retreat.'

"I had been out on the bowlder plain several hours, on the morning of April 23, 1883, collecting birds, and spying a clump of elder bushes in the distance, not far from the brook, the thought occurred to me that I might take a rest beneath their shade and at the same time be ready for any bird that put in an appearance. These bushes, or more properly trees, are a great deal larger shrub than our eastern plant, their trunks growing from 4 to 8 inches through; and if they are not the same species, their umbellate blossoms are strikingly similar, if not identical, to those of our common eastern shrub (*Sambucus canadensis*). I had hardly seated myself on an arm of the shrub when my attention was attracted to a hole in the main trunk, directly above my head. At almost the same instant a bird appeared at the opening from within, and dodged back again as soon as she saw me. The movement was executed so quickly that I was unable to tell whether it was a Wren or a Woodpecker, but concluded that it was the latter. Upon examination of the aperture it seemed to have been lately made. Of course I thought that there would be no trouble in dislodging her, and commenced to rap on the trunk of the shrub with the butt of my gun; but this seemed to have no effect. I then walked back about 50 feet, and, taking a stand, waited from ten to fifteen minutes in the hope that she would come out, affording me an opportunity to secure her and thus solve the mystery, but in this maneuver I was also baffled. I then went up to the bush and shouted with all my might, but this did not shake her nervous system in the least, when I finally resorted to my jackknife in order to enlarge the orifice, but, from its being such a tedious job, gave it up in disgust. The next morning I took a hatchet along with me, for I desired very much to know what that hole contained. It did not take me very long to cut a place large enough for me to get my hand in, and I was thoroughly surprised to learn that the bird was still on her nest. I pulled her out, and she appeared to be stupefied—dead, apparently—but soon revived. Upon further inspection I found that the nest contained eggs. The bird proved to be a female Nuttall's Woodpecker, and the eggs were pretty well advanced in incubation and would have hatched in a few days.

"The nest, which was about 5½ feet from the ground, was nearly a foot deep and about 5 inches wide. The hole at the entrance to the nest was but a little larger than a silver half dollar. The eggs were six in number, their dimensions being 0.85 by 0.66, 0.87 by 0.65, 0.82 by 0.64, 0.85 by 0.66, 0.85 by 0.66,

and 0.84 by 0.64 inch, respectively. By the above measurements one will readily see that the eggs average very evenly. They are of a pearly white color, and seem to taper off, being more pointed at the small end than is usually the case among the *Picidæ*. The male of this pair (for these were the only ones seen in the vicinity) was shot a little while before at the brook. I afterwards observed some of these birds among the oaks in the foothill canyons, hearing their notes for the first time. Dr. Cooper mentions taking the female from the nest, and perhaps this may be characteristic of the species—indeed, it may be of frequent occurrence among Woodpeckers; but of the many Woodpeckers' nests that I have examined none have been so persistent in holding the fort as *Dryobates nuttallii*."

Their food appears to consist mainly of insects and their larvæ, and probably occasionally of berries and fruits. Its favorite nesting sites are in oaks, sycamores, cottonwoods, and occasionally in elders, willows, and the giant cactus, generally in dead limbs or old stubs, and usually at no very great height from the ground. Nidification usually commences early in April and continues through May. Only one brood is raised in a season, but if the eggs are taken a second set is laid about two weeks later. Both sexes assist in the excavation of the nesting site, as well as in incubation, which lasts probably about fourteen days. Nuttall's Woodpecker, like the majority of this family, is a devoted parent, and loath to leave its eggs or young, frequently allowing itself to be caught on the nest. It is a very beneficial species to the horticulturist, and deserves the fullest protection. The number of eggs to a set varies from four to six, sets of four being most often found. They are usually short ovate in shape, occasionally ovate. The shell is fine grained, strong, pure white in color, and rather glossy.

The average measurement of twenty-two specimens in the United States National Museum collection is 21.34 by 16.19 millimetres, or about 0.84 by 0.64 inch. The largest egg measures 23.62 by 16 millimetres, or 0.93 by 0.63 inch; the smallest, 19.30 by 15.75 millimetres, or 0.76 by 0.62 inch.

The type specimen, No. 26631 (not figured), from a set of four eggs, Ralph collection, was taken near Lakeside, San Diego County, California, on May 5, 1890.

## 28. Dryobates arizonæ (Hargitt).

ARIZONA WOODPECKER.

*Picus arizonæ* Hargitt, Ibis, 1886, 115.
*Dryobates arizonæ* Ridgway, Manual of North American Birds, 1887, 286.
(B —, C —, R 365, C 437, U 398.)

Geographical range: Southern Arizona, southwestern New Mexico, and adjacent portions of western Mexico to Zacatecas and Jalisco.

The range of the Arizona Woodpecker within the United States is a rather restricted one, it having as yet been obtained only in the Chiricahua, Huachuca, Santa Rita, and Santa Catalina mountains, in southern Arizona, and on the east

side of the St. Luis Mountains, near the international boundary line, in southwestern New Mexico, where Dr. E. A. Mearns, United States Army, collected several specimens in June, 1892; but it does not appear to be very common anywhere. It is probably a resident and breeds wherever found It was first added to our fauna by Mr. H. W. Henshaw, who considers it as not uncommon in the foothills of the Chiricahua Mountains, where he took several specimens in the latter part of August, 1874, and states: "This rare Woodpecker is a common species on the foothills of the Chiricahua Mountains, where it was one of the first birds that met my eye when the section where it abounds was first entered. * * * So far as I could ascertain, at this season at least, it is confined to the region of oaks, ranging from about 4,000 to 7,000 feet, thus inhabiting a region about midway between the low valleys and the mountain districts proper. Here they appeared to be perfectly at home, climbing over the trunks of the oaks with the same ease and rapidity of movement that distinguish the motions of the Downy or Hairy Woodpecker, though their habits, in so far as they are at all peculiar, are perhaps best comparable to those of the Red-cockaded Woodpecker of the South (*Dryobates borealis*), especially their custom of moving about in small companies of from five to fifteen, though they were occasionally found singly or in pairs.

"When in pursuit of food, they almost always alighted near the base of the trees, gradually ascending and making their way along the smaller limbs and even out among the foliage, appearing to prefer to secure their food by a careful search than by the hard labor of cutting into the wood in the way the Hairy Woodpecker employs its strength. * * * I found them at all times rather shy and gifted with very little of that prying curiosity which is seen in some of the better-known species of this family; and if by chance I surprised a band feeding among the low trees, a sharp warning note from some member more watchful than the rest communicated alarm to the whole assembly, when they took flight immediately, showing great dexterity in dodging behind trunks and limbs, and making good their retreat by short flights from one tree to another till they were out of sight."[1]

Mr. F. Stephens found a nest containing young birds in the Santa Rita Mountains on May 16, 1880, in a sycamore tree; and Mr. W. E. D. Scott records another, found on May 27, 1884, in the Catalina Mountains, in an oak, about 10 feet from the ground. He says: "The nest was much like that of the Hairy Woodpecker, save that the opening was a little smaller. It contained three young birds about two-thirds grown and half feathered."[2]

The habits of the Arizona Woodpecker are probably very similar to those of the other members of the genus *Dryobates*, and this species seems to be principally confined to the oak belt and the timber of the foothills along the few streams found in the regions it inhabits. Lieut. H. C. Benson, Fourth Cavalry, United States Army, as well as Dr. A. K. Fisher, met with it in the vicinity of

[1] U. S. Geographical Surveys West of the 100th Meridian, Vol. V, 1875, pp. 389, 390.
[2] The Auk, Vol. III, 1886, p. 426.

Fort Huachuca, and the latter also found it in the Chiricahua Mountains, south of Fort Bowie. He tells me that on May 14, while collecting in Garden Canyon, in the Huachuca Mountains, a mile or more above the Post garden, he found a nest of this species in a large maple which overhung a stream. The cavity was situated in a dry branch, about 20 feet from the ground, and was about a foot in depth. It contained four young, which were still naked.

I have only seen one set of eggs of this species, which were taken near Fort Huachuca, Arizona, in May, 1890. They are usually three or four in number; the shell is close grained and glossy; they measure 21.08 by 16 millimeters, or 0.83 by 0.63 inch, and resemble the eggs of Baird's Woodpecker very closely. There are no specimens in the United States National Museum collection.

## 29. Xenopicus albolarvatus (Cassin).

WHITE-HEADED WOODPECKER.

*Leuconerpes albolarvatus* Cassin, Proceedings Academy of Natural Sciences, Philadelphia, October, 1850, 106.
*Xenopicus albolarvatus* Malherbe, Monograph of the Picidæ, II, 1862, 221.
(B 81, C 295, R 366, C 442, U 399.)

Geographical range: Higher mountain ranges of western North America; from southern California north through Oregon and Washington to southern British Columbia; east to western Nevada and western Idaho.

The habitat of the White-headed Woodpecker is restricted to the higher mountain ranges of the Pacific province. It is a bird of the pine and fir forests, and is usually resident and breeds wherever found. It is most common at altitudes of from 5,000 to 9,000 feet, but in winter it descends somewhat lower, and may then be sometimes seen as low as 3,000 feet, and occasionally even near sea level, Mr. S. Hubbard, jr., having taken a specimen near Gray's Harbor, Washington, as recorded in "Zoe" (July, 1892, p. 141). It has been met with at Similkameen, in the Cascade Mountains, in southern British Columbia, which marks the northern limit of its known range; at Mount Idaho and near Fort Sherman, Idaho, which marks the eastern, and in the Volcan Mountains, in California, which is the most southern record for this species. Mr. Robert Ridgway found it not uncommon near Carson City, while Mr. H. W. Henshaw observed it at Lake Tahoe, Nevada, and I met with it in the Blue Mountains, near Camp Harney, Oregon, where it was rarely seen. Its center of abundance appears to be found in the higher Sierra Nevadas, in California, and in the Cascade Mountains, in Oregon. Both Dr. J. C. Merrill, United States Army, and myself found it common at Fort Klamath in winter, but none apparently bred near the Post. The only nest found be me there was on the slopes of Crater Lake Mountain, about 12 miles north of Fort Klamath, at an estimated altitude of about 6,500 feet. The nesting site was excavated in an old pine stump, about 15 feet from the ground, and contained four slightly incubated eggs on May 29, 1883.

In the Blue Mountains, near Camp Harney, Oregon, this species was rare, but I found two nests there, one on May 25, 1875, containing two fresh eggs, in a dead limb of a pine, and about 25 feet from the ground. The other was found on May 6, 1877, containing four fresh eggs; the cavity was located in a dead pine stump, about 15 feet from the ground, near Ruby's sawmill, on the Canyon City road, at an altitude of about 5,500 feet; it was about 10 inches deep, the entrance hole being circular and about $1\frac{3}{4}$ inches in diameter; the eggs were placed on a layer of fine chips, and, I believe, were the first described of this species.

Mr. L. Belding writes: "Common in the fir forests of the Sierra Nevada from about 4,000 feet upward; most numerous at about 5,000 feet. Rare in the tamaracks. * * * Its burrows are often within 2 or 3 feet of the ground. I have seen two nests in cuts for shakes or shingles, made after the tree was sawed into sections, and one in a small, short stub of a dogwood (*Cornus nuttalli*); May 25, 1879, first full set of eggs taken at Big Trees. At Bloods, 7,200 feet altitude, I have taken them as late as July 17. The eggs are usually four, although I have seen five. In winter it is found sparingly in the upper edge of the foothills, at 3,000 feet altitude. I found it rather common about Big Trees in the mild January of 1879, until 2 feet of snow fell, after which none were seen."[1]

It is found on both sides of the Sierra Nevadas, but seems to be much more common on the western slope. Mr. F. Stephens writes me: "*Xenopicus albolarvatus* is a resident of the pine regions of southern California, but is not common excepting possibly in a few localities. I have never observed it below the pines. I have taken incubating birds in June in the Cuyamaca Mountains at altitudes of about 7,000 feet. The nesting sites here were in very large dead pine trees and inaccessible. The white head makes the bird easily recognizable; its notes are somewhat different from those of other Woodpeckers in this region, and seem to me more like those of *Dryobates arizonæ*. On June 19, 1893, I found a nest of this bird in the San Jacinto Mountains, at an altitude of about 5,800 feet, in a rotten pine stub about 9 feet from the ground; it contained three young of different ages, the eldest being able to fly a very little."

Mr. Rollo H. Beck informs me that he found this species fairly common in the pine timber near the road from Murphy's to the Yosemite Valley, California, and that he discovered three nests with young on June 8, 1893. These were all located in cavities in dead pine stumps, from 6 to 15 feet from the ground. A nest containing three fresh eggs was also discovered in a similar stump only 4 feet from the ground, the cavity being 8 inches deep. He writes also: "I noticed one of these birds on some fallen logs near the road, busily engaged in catching spiders, searching for grubs, and frequently flying after passing insects, catching them in mid-air in the manner of the California Woodpecker."

Dr. James C. Merrill, United States Army, makes the following interesting remarks about this species, as observed by him at Fort Klamath, and as these entirely agree with my own, I give them entire:

[1] Land Birds of the Pacific District, California Academy of Sciences, II, 1890, p. 63.

"*Xenopicus albolarvatus.*—This interesting Woodpecker was first observed November 9; by December it had become rather abundant, and so continued until the latter part of February, but after the middle of March none were seen. During the breeding season careful search failed to reveal its presence near the fort, nor was it found in the higher mountains north of the valley in July and August. One would think that the peculiar coloration of the White-headed Woodpecker would make it very conspicuous and its detection an easy matter, but this is by no means the case, at least about Fort Klamath. On most of the pines in this vicinity there are many short stubs of small broken branches projecting an inch or two from the main trunk. When the sun is shining these projections are lighted up in such a manner as to appear quite white at a little distance, and they often cast a shadow exactly resembling the black body of the bird. In winter, when a little snow has lodged on these stubs, the resemblance is even greater, and almost daily I was misled by this deceptive appearance, either mistaking a stub for a bird or the reverse.

"I have rarely heard this Woodpecker hammer, and even tapping is rather uncommon. So far as I have observed, and during the winter I watched it carefully, its principal supply of food is obtained in the bark, most of the pines having a very rough bark, scaly and deeply fissured. The bird uses its bill as a crowbar rather than as a hammer or chisel, prying off the successive scales and layers of bark in a very characteristic way. This explains the fact of its being such a quiet worker, and, as would be expected, it is most often seen near the base of the tree, where the bark is thickest and roughest. It must destroy immense numbers of *Scolytidæ*, whose larvæ tunnel the bark so extensively, and of other insects that crawl beneath the scales of bark for shelter during winter. I have several times imitated the work of this bird by prying off the successive layers of bark, and have been astonished at the great number of insects, and especially of spiders, so exposed. As the result of this, and of its habit of so searching for food, the White-headed Woodpeckers killed here were loaded with fat to a degree I have never seen equaled in any land bird, and scarcely surpassed by some Sandpipers in autumn.

"Though not shy, and with care generally approachable to within a short distance, it is watchful and suspicious, and seems to know very well what is going on, even if it does not see fit to fly away, though it is more apt to do this than to dodge around the trunk. The flight is direct, and rather slow and heavy. Its skull is noticeably less hard and dense than that of *Dryobates harrisii* or *Picus arcticus*. During the winter it is silent, the only sound I have heard it make being a harsh screech when wounded."[1]

Since then the Doctor has also found it during the winter of 1894–95 near Fort Sherman, Idaho, where it is not uncommon, and probably breeds in the mountains in the vicinity.

[1] The Auk, Vol. V, 1888, p. 253.

I consider the White-headed Woodpecker a rather silent and more sedate bird than most of the other members of this family, the only note I have heard it utter being a sharp, clear "witt-witt" as it passes from one tree to another. During the winter its food consists principally of spiders and insects and their larvæ; and in summer, as Mr. Charles A. Allen, of Nicasio, California, informs me, "It feeds its young on the large black ants with which all the dead pines and stumps are covered at that time of year."

Nidification usually begins about the middle of May and continues through June. The sexes relieve each other in the preparation of the nesting site, which is usually located in a dead stub of a pine or fir; one that is partly decayed seems to be preferred as it rarely excavates one in solid, hard wood. The nesting sites are seldom situated over 15 feet from the ground, and sometimes as low as 2 feet. The entrance hole is about $1\frac{1}{2}$ inches wide, perfectly circular, and just large enough to admit the bird; the inner cavity gradually widens towards the bottom, and is usually from 8 to 12 inches deep, the eggs lying on a slight layer of fine chips, in which they become well embedded as incubation advances. Occasionally a rather peculiar site is selected. Mr. Charles A. Allen found a nest of this species in a post in one of the snow sheds on the Central Pacific Railroad, between Blue Canyon and Emigrant Gap, about 40 feet from the entrance of the shed, and some thirty trains passed daily within a few feet of the nest, which contained six eggs when found. Incubation lasts about fourteen days, and both sexes assist in this, as well as in the care of the young, which are born blind and remain so until about half grown.

The number of eggs to a set varies from three to seven, sets of four being most common. There is only a single set of five in the United States National Museum collection, taken by Mr. L. Belding, at Big Trees, California, on June 8, 1879; but Mr. Charles A. Allen writes me that he has found seven eggs in one of their nests. These vary in shape from ovate to short ovate; the shell is pure white, fine grained, and only moderately glossy. When fresh and unblown they are of a delicate pinkish tint and semitranslucent, and the yolk can be plainly seen; as incubation advances they become more and more opaque.

The average measurement of forty-one specimens in the United States National Museum collection is 24 by 18.07 millimetres, or about 0.95 by 0.71 inch. The largest egg of the series measures 25.40 by 19.30 millimetres, or 1.00 by 0.76 inch; the smallest, 21.84 by 17.78 millimetres, or 0.86 by 0.70 inch.

The type specimen, No. 19436 (not figured), from a set of four eggs, Bendire collection, was taken by the writer, near Camp Harney, Oregon, on May 6, 1877.

## 30. Picoides arcticus (Swainson).

ARCTIC THREE-TOED WOODPECKER.

*Picus (Apternus) arcticus* Swainson, Fauna Boreali Americana, II, 1831, 313.
*Picoides arcticus* Gray, Genera of Birds, I, 1845, 434.
(B 82, C 300, R 367, C 443, U 400.)

Geographical range: Northern North America; south to the northern border of the eastern United States; regularly to northern New England and the northern parts of New York, Michigan, Wisconsin, and Minnesota; casually to Massachusetts, northern Connecticut, northern Pennsylvania, and northern Illinois. In the Rocky Mountains to Montana and Idaho, and in the western United States south to California and Nevada to about latitude 39° (Lake Tahoe), and possibly still farther south in the Sierra Nevada in winter.

The northern limits of the range of the Arctic or Black-backed Three-toed Woodpecker are not yet very well defined, and, judging from the few specimens from far northern localities in the United States National Museum collection, it appears to be much rarer there than the next species. It certainly must be considered a rare resident in Labrador, as Mr. L. M. Turner obtained only a single specimen during several years' residence in the district of Ungava. This was taken at the "Forks" on December 18, 1882, and none were observed by him in the vicinity of Fort Chimo. There are several specimens in the collection from Moose Factory, James Bay, and others from Forts Rae and Providence, on Great Slave Lake; from Fort Chipewayan, on Lake Athabasca, and a single one from Fort Reliance, on the Upper Yukon River, Alaska, in latitude 64° N., which marks about the most northern point of its known range. The Museum possesses another Alaska specimen also, taken in March, 1893, by Mr. C. L. McKay, on the Mechatna River, and it appears to be rare here also. Its southern limits are much better defined, and include the northern border of the eastern United States, reaching the southern point of its range in the Adirondacks, New York, in about latitude 44°, where it also breeds; and occasionally stragglers are taken somewhat farther south in winter—in Massachusetts, for instance; it is also recorded from Connecticut, northern Pennsylvania, and northern Illinois. It is not uncommon in the northern parts of Michigan, Wisconsin, and Minnesota, and breeds in suitable localities in all these States. It does not appear to occur in the southern Rocky Mountains in the United States, excepting in Montana, but it is abundant in the Cascade Mountains, Oregon, and in the Sierra Nevadas in California and Nevada, south to about latitude 39° (Lake Tahoe). It has also been met with in Washington, Idaho, and eastern British Columbia, and is said to be common in the wooded parts of Manitoba; it is certain also to occur in suitable localities in Assiniboia and Alberta, as well as in the intervening regions wherever suitable timber is found.

The Arctic Three-toed Woodpecker is essentially a bird of the pine, spruce, fir, and tamarack forests, and is rarely seen in other localities. It is generally a resident, rarely migrating to any distance, and probably breeds wherever found.

Its flight is swift, greatly undulating, and is often protracted for considerable distances. It is quite common in northern Maine, and Mr. Manly Hardy considers it as the tamest and most stupid of the Woodpeckers found in that State. He writes me: "Here (in Maine) it is rarely, if ever, found in any numbers far from burnt tracts; if in green growth, usually singly, or at most in pairs; but on newly burnt lands specimens may be found by the score, and their sharp, shrill 'chirk, chirk' can be heard in all directions. It seems to feed entirely on such wood worms as attack spruce, pine, and other soft-wood timber that has been fire-killed. Specimens are so abundant in such places that I once shot the heads off of six in a few minutes when short of material for a stew."

The food of this Woodpecker seems to consist almost entirely of tree-boring insects and their larvæ, mainly *Buprestidæ* and *Cerambycidæ;* but Audubon states that it feeds also on berries and fruits. It never attacks a healthy tree, and is far more beneficial than harmful, and deserves protection.

Mr. J. W. Preston, of Baxter, Iowa, writes me that he found this Woodpecker breeding in Becker County, Minnesota, the nesting site being situated in a live larch tree, about 30 feet from the ground; it contained young on June 13, 1887. Dr. James C. Merrill, United States Army, found it breeding in Prickly Pear Canyon, on the road between Helena and Fort Shaw, Montana, as well as near Fort Klamath, Oregon; and Mr. R. S. Williams writes me that the species is tolerably common about Columbia Falls, Montana. Mr. R MacFarlane found it nesting near Fort Providence, Great Slave Lake, Northwest Territory, and Mr. C. Krieghoff at Three Rivers, Lower Canada, eggs taken by the two last-named gentlemen being now in the collection. Dr. C. Hart Merriam found two nests, with eggs, of this species in the Adirondacks, near Seventh Lake, Fulton Chain, Hamilton County, New York, on May 27 and June 2, 1883, and has kindly furnished me with the following notes:

"The water of Seventh Lake, Fulton Chain, had been raised by a dam at the foot of Sixth Lake, flooding a considerable area along the inlet, and the trees killed by the overflow stood in about 6 feet of water. In 1883 the place was first visited by me, May 27. Both species of Three-toed Woodpeckers (*Picoides americanus* and *arcticus*) were tolerably common, and one new nest of each was found. That of *P. arcticus* contained one fresh egg. The nest was 10 inches deep, and the opening within 5 feet of the surface of the water. It was in a dead spruce, 10 inches in diameter. A pair of White-bellied Swallows (*Tachycineta bicolor*) had feathered their nest in a deserted Woodpecker's hole higher up in the same stub. The place was next visited June 2, but the date proved still too early. Several unfinished nests of *P. americanus* were found, and one completed nest with four fresh eggs of *P. arcticus*. Like the one found on my first visit, it was in a dead spruce and about 5 feet above the water. The nest was 11 inches deep and the orifice $1\frac{3}{4}$ inches in diameter. Many of last year's nests were occupied by White-bellied Swallows. Some of the Three-toed Woodpeckers were unusually noisy, the males scolding, rapping loudly on the dead wood, and making much ado for these ordinarily quiet birds. Nests were found in balsam,

spruce, and tamarack trees, and varied from 4 to 15 feet above the water. A fortnight later (June 15) I found a nest of *Picoides arcticus*, containing young (apparently about a week old), at West Pond, near Big Moose Lake. It was in a tamarack tree and about 10 feet above the ground. A last year's nest in an adjacent tamarack was occupied by a family of flying squirrels."

I first met with the Arctic Three-toed Woodpecker on the summit of the Blue Mountains, near Soda Springs, Grant County, Oregon, in August, 1876, at an altitude of about 5,500 feet, where it was rare, and again near Fort Klamath, during the year 1882–83. There they were fairly common in winter, frequenting the more open pine forests in the mountain valleys, but were rarely seen by me in summer, and I believe they mostly retired to an extensive burnt tract, some 30 miles to the northeast of the post, near the head waters of the Deschutes River, to breed. Like the Hairy Woodpecker, they are persistent drummers, rattling away for minutes at a time on some dead limb, and are especially active during the mating season, in April. I have located more than one specimen by traveling in the direction of the sound when it was fully half a mile away. On May 10, 1883, while en route from Fort Klamath to Linkville, Oregon, and only a few miles from the latter place, just where the pine timber ended and the sagebrush commenced, I found a male busily at work on a pine stump, only about 2½ feet high and about 18 inches in diameter, standing within a few feet of the road, and close to a charcoal burner's camp, in quite an open and exposed situation, nearly all the timber in the vicinity having been cut down. The stump was solid, full of pitch, and showed no signs of decay; the entrance hole was about 1½ inches in diameter and 8 inches from the top. The cavity, when first examined, was only about 2 inches deep, and on my return, two days later, it had reached a depth of 4 inches; the female was then at work. To make sure of a full set of eggs, I waited until the 25th. The cavity then was found to be 18 inches deep, and was gradually enlarged toward the bottom. The four eggs it contained had been incubated about four days. The female was on the nest, and uttered a hissing sound as she left it, and might easily have been caught, as she remained in the hole until the stump was struck with a hatchet. The sides of the cavity were quite smooth, and the eggs were partly embedded in a slight layer of pine chips. The locality where this nest was found was near the top of a low divide, not over 4,100 feet in altitude. The majority of nesting sites seem to be located in dead trees or stumps, and rarely at any great height varying usually from 2½ to 8 feet from the ground.

Both sexes assist in nidification, which is usually at its height between May 20 and June 10, as well as in incubation, which lasts about two weeks. Only one brood is raised in a season. The eggs are generally four in number. These are mostly ovate in shape. The shell is fine-grained and only moderately glossy, and, like the eggs of all Woodpeckers, pure white in color.

The average measurement of thirteen eggs in the United States National Museum collection is 24.38 by 18.29 millimetres, or 0.96 by 0.72 inch. The largest egg measures 25.40 by 19.56 millimetres, or 1.00 by 0.77 inch; the smallest, 22.35 by 17.53 millimetres, or 0.88 by 0.69 inch.

The type specimen, No. 19411 (not figured), from a set of four eggs, Bendire collection, was taken by the writer, about 30 miles south of Fort Klamath, Oregon, on May 25, 1883.

## 31. Picoides americanus Brehm.

AMERICAN THREE-TOED WOODPECKER.

*Picoides americanus* Brehm, Handbuch der Vögel Deutschlands, 1831, 195.
(B 83, C 301, R 368, C 444, U 401.)

Geographical range: Northern North America east of the Rocky Mountains; south (principally in winter) to the northern border of the United States; west, casually, to the western slope of the Bitter Root Mountains, in eastern Idaho.

The American Three-toed, also known as the "Banded-backed," "White-backed," or simply as "Banded Three-toed" Woodpecker, is mostly resident and breeds wherever found. Along our northern border it seems to be much rarer than the preceding species, and only breeds in small numbers in Maine, the White Mountains in New Hampshire, the Adirondacks in New York, possibly in the Green Mountains in Vermont, and probably along the west shore of Lake Superior in Minnesota; but it is evidently still rarer in the western portions of its range, within the limits of the United States. The only western specimens, taken within our borders, in the United States National Museum collection, are a female, collected by Dr. J. G. Cooper, on September 9, 1860, on the western slope of the Bitter Root Mountains, Idaho, and a pair sent to me by Mr. R. S. Williams, of Columbia Falls, Montana, taken on October 9 and 11, 1893. He writes me: "It is much rarer here than *P. arcticus*, and I consider it a much more silent bird, its ordinary call notes differing much from those of the former and resembling more those uttered by the genus *Dryobates*."

Mr. L. M. Turner met with this Woodpecker in the vicinity of Fort Chimo, Ungava, and secured several specimens at Whitefish Lake, where the spruce and junipers attain a slightly greater size than nearer the Post. In his manuscript notes he says: "Farther to the southward, where the timber is larger and better suited to their habits, they become correspondingly more numerous, and in southern Labrador, south of the 'Height of Land,' they are reported to be quite plentiful. The manner of flight of this species is less vigorous than that of *Picoides arcticus*, yet differing in a manner that is difficult to describe. These birds are not easy to detect, as they rarely utter a note, and then only a squealing, prolonged sound, similar to that made by *Sphyrapicus varius*. They are oftener found solitary, rarely two being found in the same patch of wood, excepting in the breeding season, and later when followed by their young. I observed their habit of decorticating large areas of the trunks of trees, very rarely the larger branches, and in only one instance have I found a funnel-shaped hole in a much-decayed snag."

Stragglers have been taken in winter in Massachusetts and also in Wisconsin, but it does not often find its way so far south. According to Sir John

Richardson, it is found in all the forests of spruce fir lying between Lake Superior and the Arctic Sea, and is the most common Woodpecker north of Great Slave Lake. Its food, like that of the preceding species, consists principally of wood-boring insects and their larvæ, found in dead and decaying timber.

Mr. Manly Hardy informs me that the American Three-toed Woodpecker is rather rare in Maine, and he has no positive proof that it breeds there.

Dr. C. Hart Merriam was, I believe, the first naturalist who took the eggs of this species within the limits of the United States, and he published the following account in the "Bulletin of the Nuttall Ornithological Club" (Vol. III, 1878, p. 200):

"*June 4, 1878.*—Shortly after crossing Moose River this morning, en route for the Fulton chain of lakes, Mr. C. L. Bagg and I were so fortunate as to secure a set of the eggs, with both parent birds, of *Picoides americanus* (old *hirsutus*). We had just crossed the boundary line between Lewis and Herkimer counties, when Mr. Bagg called my attention to a 'fresh hole,' about 8 feet from the ground, in a spruce tree near by. On approaching the tree a yellow crown appeared in the hole, showing that the male bird was 'at home.' To prevent his escape I jumped toward the tree and introduced three fingers, which were immediately punctured in a manner so distasteful to their proprietor as to necessitate an immediate withdrawal and exchange for the muzzle of my friend's gun. A handkerchief was next crowded into the hole, but was instantly riddled and driven out by a few blows from his terrible bill. It was then held loosely over the hole, and as the bird emerged I secured and killed him. Through the kindness of a friend, my pocket contained one of those happy combinations of knives, saws, and button hooks—a sort of tool chest in miniature—which one sometimes sees in the shop windows and is apt to regard with awe rather than admiration, but which constitutes, nevertheless, one of the most useful articles in a naturalist's outfit. With this instrument we were enabled to saw a block from the face of the nest, and to secure, uninjured, the four nearly fresh eggs which it contained. While wrapping up the eggs the female returned, and, as she alighted on the side of the tree, was killed by Mr. Bagg. The orifice of the hole was about 8 feet high and 1½ inches in diameter, and the cavity was about 10 inches deep. * * * So far as I am aware, this rare Woodpecker is only found along the eastern border of Lewis County, in the Adirondack region, where it is a resident species, and even here it is much less common than its congener, the Black-backed Woodpecker."

Dr. Merriam also informs me that "numerous nests were found in the Adirondacks in June, 1883. Most of them were in the flooded timber bordering the inlet of Seventh Lake, Fulton Chain. They varied from 5 to 12 feet in height above the water, and were in spruce, tamarack, pine, balsam, and cedar trees. A set of four fresh eggs was taken June 8. The feathers were worn off the bellies of both male and female before the nests were completed." He also took another set of four eggs of this species, one of them a runt, on June 8,

1883, near Sixth Lake, Fulton Chain, Hamilton County, New York, in a similar situation, and generously presented both of these sets to me.

During a careful examination of the series of specimens of this bird and its two recognized subspecies, I found several skins collected by Mr. R. MacFarlane in the vicinity of Fort Anderson, in latitude 68° 30′ N., Northwest Territory, which appear to me to come nearer to this species than to *Picoides americanus alascensis*, to which Mr. E. W. Nelson refers them. Mr. MacFarlane also forwarded two sets of eggs, with the parents, at the same time, and some of these are now in the United States National Museum collection. A single egg, originally from a set of three taken on May 30, 1863, accompanied by the female bird, was taken from a cavity in a pine tree, 4 feet from the ground, and another set of four, of which there are three eggs remaining, and likewise accompanied by the male bird, was taken on June 5, 1864, from a hole in a dry spruce, situated about 6 feet from the ground. The eggs from the last set were said to have been lying on the decayed dust of the tree, and were perfectly fresh when found. For some reason no mention has been made of these eggs in the "History of North American Birds," although they were in the collection when that work was written and were correctly labeled.

The general habits of the American Three-toed Woodpecker appear to be very similar to those of the preceding species, and it seems, if possible, to be even a more hardy bird than the latter, extending its range to the northern limit of trees. Nidification, even in the most northern parts of its range, seems to commence about the same time as it does in the Adirondacks, long before the ice and snow disappear. The usual number of eggs laid appears to be four, and both sexes assist in incubation. Mr. MacFarlane, in his manuscript notes, mentions finding a nest of four young Woodpeckers, in all probability of this species (as one of these birds was seen in the vicinity on June 21, 1862) which were then already apparently about a week or ten days old. As incubation probably lasts about fourteen days, the eggs must have been laid in the last week in May. The eggs of the American Three-toed Woodpecker are ovate in shape and pure white in color; the shell is fine grained and only moderately glossy.

The average measurement of twelve eggs in the United States National Museum collection is 23.41 by 17.80 millimetres, or about 0.92 by 0.70 inch. The largest egg measures 24.13 by 17.78 millimetres, or 0.95 by 0.70 inch; the smallest, 23.11 by 17.78 millimetres, or 0.91 by 0.70 inch.

The type specimen, No. 23785 (not figured), Bendire collection, from a set of four eggs, was taken by Dr. C. Hart Merriam, on Moose River, Herkimer County, New York, on June 4, 1878, as previously stated.

## 32. Picoides americanus alascensis (Nelson).

ALASKAN THREE-TOED WOODPECKER.

*Picoides tridactylus alascensis* Nelson, Auk, I, April, 1884, 165.
*Picoides americanus alascensis* Ridgway, Proceedings U. S. National Museum, VIII, 1885, 355.

(B —, C —, R —, C —, U 401*a*.)

Geographical range: Alaska Territory; casually? south through western British Columbia to northwestern Washington (vicinity of Mount Baker); east irregularly to Great Bear Lake and the Mackenzie River Valley, Northwest Territory, Dominion of Canada.

The Alaskan Three-toed Woodpecker, described by Mr. E. W. Nelson in "The Auk" (April, 1, 1884), is mainly distinguishable from the preceding species by its much more conspicuous nuchal collar and generally heavier white barring of the back and rump, larger white wing markings, and with the top of the head more or less mixed with white. The most typical specimens of this race come from central Alaska, and as it approaches the range of *Picoides americanus* on the east it gradually intergrades with this as well as with *Picoides americanus dorsalis* in the south, and it is largely a matter of individual opinion just where to draw the line of its range; I prefer to restrict it mainly to Alaska. Very little is as yet known about its general habits, food, etc., but it is not likely that it differs much in these respects. It is probably a resident and breeds wherever found. Mr. E. W. Nelson, in his report on the "Natural History Collections made in Alaska, 1877–1881," published by the Signal Service, United States Army, 1887 (p. 159), says: "On the Yukon these birds are said to prefer the groves of poplars and willows to the spruces. During my visits to the interior I saw it alive only in a few instances, and learned nothing of its habits. From the number of skins brought me by the few traders, taken at various points along the course of the Yukon, from near the mouth of that stream to the vicinity of Fort Reliance,[1] its great abundance is attested."

Nothing has been published about its nesting habits and eggs, but these are not likely to differ from those of the preceding form.

## 33. Picoides americanus dorsalis Baird.

ALPINE THREE-TOED WOODPECKER.

*Picoides dorsalis* Baird, Birds of North America, 1858, 100.
*Picoides americanus dorsalis* Baird, Ornithology of California, I, 1870, 386.

(B84, C 301*a*, R 368*a*, C 445, U 401*b*.)

Geographical range: Rocky Mountain regions of the United States and the Dominion of Canada; south to Arizona and New Mexico; north through Colorado and intervening States; and through Alberta and eastern British Columbia to Fort Liard and Cassiar, and occasionally to southern Alaska (Fort Kenay).

The Alpine or "Striped-backed Three-toed" Woodpecker is the most southern representative of this genus, and appears to be confined mainly to the Rocky

[1] The Fort Reliance referred to by Mr. Nelson is situated on the Upper Yukon River, in Alaska; another (now abandoned) Hudson Bay Company post, situated on the eastern end of Great Slave Lake, was similarly named, and should not be confounded with it.

Mountains and neighboring ranges. It is readily distinguishable from the two preceding forms by the continuous white middle line of the back, with few, if any, black bars, the markings being mostly longitudinal, and smaller white spots on the quills. The top of the head is much less streaked with white than the Alaskan race, and the bill is also more slender than in the latter. It is probably resident and breeds wherever found. It has been met with in the Black Mountains, at Cantonment Burgwin, near Taos, New Mexico; in the White and San Francisco Mountains, in Arizona; and in the higher ranges in Colorado, etc., as well as in the Rocky Mountains, and the Selkirks in Alberta, and eastern British Columbia northward to about Fort Liard and Cassiar, near the northern boundary of this province, whence it straggles occasionally along the coast ranges into southern Alaska (Fort Kenay). It rarely occurs north of latitude 62°, however, where it is replaced by the preceding subspecies. Comparatively little has yet been recorded about the nesting habits, etc., of this subspecies.

Dr. Edgar A. Mearns, United States Army, in his paper on "Arizona Mountain Birds," says: "The Alpine Three-toed Woodpecker breeds commonly throughout the pine belt, seldom ascending far into the spruce woods of the highest peaks. On the northwestern slope of San Francisco Mountain I discovered a nest of this species on June 8, 1887. The female was seen alone, pecking at a large yellow pine, which, although dead, still retained its bark and was quite solid. While feeding she uttered a peculiar, harsh, nasal cry. I shot her, and then noticed a small, neatly bored hole in the south side of the pine trunk, about 30 feet from the ground and away from branches. With the aid of a rope, and taking a start from the saddle, I was scarcely able to climb to the nest, which the male did not quit until I was well up; then he came out and uttered a sudden, sharp 'whip-whip-whip' in a menacing tone, remaining hard by while I worked with saw and chisel. It took me nearly half an hour to make an opening sufficiently large to admit the hand, as the burrow was situated so extraordinarily deep. Two young, male and female, with feathers just sprouting, were found on a bed of small chips at the bottom of the burrow, not more than 8 inches lower than the entrance, but in the very heart of the tree, the cavity being oblique and pear-shaped, and having the strong odor characteristic of Woodpeckers' nests in general. Both parents and their progeny were preserved, and are now in the American Museum collection. The irides of the adults were dark cherry red; their feet, claws, and basal half of mandible plumbeous, the rest of the bill being plumbeous black."[1]

Mr. W. G. Smith writes me: "I found this bird quite common in Arapahoe County, and have also met with it in summer in Estes Park, Larimer County, Colorado, and have reason to believe that it breeds there; I never saw it at low elevations." Mr. G. F. Breninger informs me that he found a nest of this subspecies in the beginning of May, at an altitude of about 6,500 feet, west of Fort Collins, Colorado; the nesting site was located in a burnt spruce stump, about 15 feet from the ground, and contained five eggs.

[1] The Auk, Vol. VII, 1890, p. 252.

There are no eggs of the Alpine Three-toed Woodpecker in the United States National Museum collection, and I am unable to give exact measurements; but these are not likely to differ much in shape or size from those of the American Three-toed Woodpeckers.

## 34. Sphyrapicus varius (Linnæus).

YELLOW-BELLIED SAPSUCKER.

*Picus varius* Linnæus, Systema Naturæ, ed. 12, I, 1766, 176.
*Sphyrapicus varius* Baird, Birds of North America, 1858, 103.
(B 85, C 302, R 369, C 446, U 402.)

Geographical range: Eastern and northern North America; in the eastern parts of the Dominion of Canada north to Nova Scotia, New Brunswick, southern Quebec and northern Ontario; thence in a northwesterly direction to Forts Resolution, Providence, and Rae, on Great Slave Lake, and somewhat north of Fort Simpson, Northwest Territory, to about latitude 63° 30′ N.; west, to Fort Liard, in northeastern British Columbia, and in the United States to North and South Dakota, Nebraska, Kansas, the Indian Territory, and Texas; south, in winter, to the West India Islands, and through Mexico to Guatemala, Honduras and Costa Rica, Central America. Accidental in Greenland.

The Yellow-bellied Sapsucker, also known as "Red-throated Sapsucker," "Squealing," and "Whining Woodpecker," is a common summer resident in suitable localities in the eastern United States north of about latitude 42°, and in Pennsylvania, Ohio, Indiana, and Illinois it is known to breed as far south as latitude 40°, while in the Smoky Mountains, in western North Carolina, it reaches the extreme southern points of its breeding range in the southeastern corner of Macon County, close to the northern border of Georgia, near latitude 35°. Here Mr. William Brewster, to whom the ornithologists of the United States are greatly indebted for a large amount of valuable information, met with this species sparingly, and shot two specimens, both incubating, in May, 1885. It is claimed, however, that it has also been found breeding on the Medina River, near San Antonio, Texas, by Dr. Heerman, and that its eggs were taken by him, which would extend its breeding range still farther south. More recent observers do not appear to confirm this, and report *Sphyrapicus varius* only as a migrant in that vicinity.

Near the Atlantic coast, in the maritime provinces of the Dominion of Canada, it is rather rare, and I believe it has not yet been found in Newfoundland or Labrador, but it is more common in the interior. It is an abundant summer resident in the northern New England States and northern New York; and in the Adirondacks it appears to me to outnumber all other Woodpeckers.

Mr. W. E. Loucks, of Peoria, Illinois, writes me: "I consider this bird to be a tolerably common resident here; I have found it breeding, and a few may remain here through the winter, as I have seen them quite late in the fall. On May 18, 1891, while collecting in the river bottom, I discovered a nest of this species in the trunk of a solid dead tree, about 15 feet from the ground. I gave

the trunk a sharp rap with my walking stick; this had the effect of bringing out a female Sapsucker, which gazed out inquisitively, and then flew to a distant branch and was joined by her mate. Climbing to the hole, I found it had been dug into the solid wood for about 3 inches, and, upon opening it to secure the eggs, I found the depth to be about a foot. The excavation tapered from the entrance to the bottom, the diameter of the latter being somewhat greater. The sides had been finely and evenly chiseled, far surpassing any nest of a Woodpecker that it has been my lot to examine. The entrance itself was a marvel, being about 1½ inches in diameter, and extending about 3 inches into the wood. It was so perfect that it resembled an auger-bored hole. The excavation contained five partly incubated eggs, of a dirty-white color, which were deposited upon a good bed of chips at the bottom. The birds were not very shy, sitting around on the dead limbs, preening their feathers, making short visits to some other tree, and then returning. I took another set of eggs on June 8, and found the birds there in summer in succeeding seasons, but took no nests."

Mr. D. B. Burrows, of Lacon, Illinois, likewise informs me that the Yellow-bellied Sapsucker is a common summer resident of Marshall and adjoining counties in Illinois, where it is confined almost entirely to the river bottoms. He wrote me: "These birds make their appearance here the latter part of April, and nesting begins by the middle of May or the first week in June. During my collecting trips by skiff in the overflowed bottom lands I always met with this bird, and considered it common. They are easily located by their peculiar complaining but rather feeble calls, and a few moments' watching will usually locate the nesting site. When nesting they always seem to be uneasy if their nest is approached and very soon fly to the tree in which it is located. In most instances it is a newly excavated cavity in a dead willow, ranging from 8 to 40 feet from the water or ground."

Prof. Barton W. Evermann records it as a rare summer resident in Carroll County, Indiana, where he has also obtained it in winter, on December 15, 1884, and January 11, 1885.

Dr. Elliott Coues gives it as a common summer resident in the wooded bottoms of the Missouri region, and found it breeding commonly along the Red River in North Dakota. It appears also to be common throughout the wooded regions of the provinces of Manitoba, eastern Assiniboia, and Saskatchewan, Canada, and thence northward as already indicated. A set of eggs taken near Fort Resolution, Great Slave Lake, in June, 1862, by Mr. Alex. McKenzie, is now in the United States National Museum collection. Mr. R. MacFarlane also found it breeding at Fort Providence, near the head waters of the Mackenzie River, in the spring of 1886, this being the most northern breeding record known to me; but there is a specimen in the collection which is labeled as having been taken 100 miles northwest of Fort Simpson, which marks the most northern known point of its range, where it probably also breeds. The western limits of its breeding range in the United States are not well defined; I have no records from either Kansas or Nebraska, and doubt if it breeds in the former, or much beyond the eastern limits of the latter State.

The Yellow-bellied Sapsucker is a regular migrant, usually arriving on its breeding grounds in our more northern States about the middle of April, the males preceding the females about a week, and returning to its winter homes in the south in the latter part of September and throughout October; while many, presumably birds which spend the summer in the more southern portions of their breeding range, extend their migrations to the West India Islands, and others even through Mexico to Guatemala and Honduras, in Central America. It is sometimes met with in winter as far north as latitude 40°, and occasionally even farther. None of our Woodpeckers are more noisy and boisterous than this species; their querulous call notes are uttered very frequently after their return from their winter homes, and the males may at this time be heard drumming almost incessantly, resorting to a resonant limb of some tree, the gable of a roof, and even to tin escape pipes. Dr. C. Hart Merriam, in his paper on the "Birds of Lewis County, New York," makes the following remarks on this subject: "At this season scarcely an hour passes, from daylight till sunset, that one or more can not be heard drumming with commendable perseverance upon the tin roofs, eave troughs, or escape pipes of our houses or some of the outbuildings. They strike the tin violently half a dozen or more times, evidently enjoying the sound thus produced, and then rest a few minutes before repeating the performance. Each Woodpecker usually returns to the same spot, and on our roof are several patches the size of one's hand from which the paint has been entirely drummed off. On the escape pipe they sometimes follow around a joint, and by constant and long-continued pounding so loosen the solder that the dependent portion of the pipe falls down. How they manage to cling to these vertical pipes and nearly perpendicular portions of the roof is a mystery to me. I have seen both sexes at work on our roof, but the female does not often indulge in this pastime, and is rarely observed to take part in the boisterous gambols of the males."[1]

This species is a true Sapsucker; its hyoid apparatus is not as well developed as is the case in the majority of our Woodpeckers, the tongue being but slightly extensile and reaching only a little distance beyond the tip of the bill. One of the most notable peculiarities of this Woodpecker and that from which it derives the name of "Sapsucker," is its habit of tapping certain trees, especially in the spring of the year, puncturing both the outer and inner bark with small holes resembling gimlet holes, which causes the sap to flow freely; on this, as well as on the tender inner bark, it lives to a considerable extent.

At this season of the year I believe the greater portion of their sustenance is derived in this manner, varied with a diet of spiders, ants, beetles, and other winged insects and such of their larvæ as are found hidden under the bark; while they rarely dig sufficiently deep in the more solid wood to reach those of the *Buprestidæ* and other wood borers, which are the staple food of the majority of our Woodpeckers. For this reason, instead of being a beneficial species, like the rest of this family, in certain localities, as where apple orchards are abun-

[1] Bulletin Nuttall Ornithological Club, Vol. IV, 1879, p. 2.

dant, it becomes a nuisance, and materially injures, and eventually kills, many such trees. Indirectly it also causes the death of many a Hairy and Downy Woodpecker (the best friends the fruit grower has), these species being frequently shot through ignorance of their habits or because they are mistaken for Sapsuckers. Besides puncturing apple trees, it is also partial to the thorn apple, elm, white and yellow birch, red and sugar maple, poplar, red oak, hemlock, white and mountain ash, and several species of pines. That it should be fond of the sweet sap of trees does not surprise me, as this contains considerable nourishment, and likewise attracts a good many insects, which the birds eat; but it is not so easy to account for its especial predilection for the sap of the mountain ash, which has a decidedly bitter taste, and I believe possesses intoxicating properties, unless it be taken for the latter purpose; and the fact that after drinking freely of the sap of this tree it may often be seen clinging to the trunk for hours at a time, as if stupefied, seems to confirm this view. It is well known that some of our birds indulge in such disreputable practices, and possibly this species must be included in the number, as there are sots among birds as well as among the genus *Homo*. Aside from sap, the soft inner bark of trees, and the various insects already mentioned, it feeds to a considerable extent on berries of different kinds, such as those of the sour gum, dogwood, frost grapes, blueberries, raspberries, strawberries, and blackberries, as well as occasionally, when hard pressed by hunger, on nuts, acorns, and sometimes even on Indian corn.

Mr. Otto Widmann, of Old Orchard, Missouri, has kindly furnished me with the following notes, as observed by him in that vicinity: "They are unobtrusive and rather sluggish birds, quite unlike the Hairy and Downy Woodpeckers. They may be seen sitting for half an hour at a time in the same place, sometimes crosswise on a branch. During a late wintry spell, when a freezing rain had enveloped everything in a sheet of ice, a Sapsucker hugged a piece of bacon hung up in a tree for two whole days. While the Downy and Hairy never get tired of eating nuts, the Sapsucker uses them only when hard pressed by hunger, and after his return in February he spends his whole time puncturing the pines. His favorite tree among our ornamental evergreens is the Austrian pine, his second choice is the Scotch pine, while he never taps the white pine and Norway spruce. Of deciduous trees he occasionally punctures the shell-bark hickory, sugar maple, and crab apple; this, however, is not done to any great extent.

"The trunks and larger limbs of the Austrian and Scotch pines look very badly at times, but, strange to say, though they are not only girdled, but in some places compactly covered with holes, the trees thrive as though they had not been hurt by the perforations and loss of sap. This sap has no terebinthine taste, but is as sweet and pure in flavor as that of a deciduous plant; but the exudations of resin, the secondary result of the Sapsucker's labors, mar the appearance of these trees by running down its sides or hardening into unsightly lumps. Many of the birds remain in southern Missouri during winter."

Mr. Manly Hardy, of Brewer, Maine, writes me as follows about this species: "Though not generally considered as a very hardy bird, they are really one of our very earliest migrants to arrive here in the spring. I have heard them drumming in March, when the thermometer was from 15° to 20° below zero, just as soon as the first sign of sunrise could be noticed, on one of the very coldest mornings I ever experienced. I have sometimes been inclined to the belief that some of them hibernated in hollow trees and passed the winter with us. They have spoiled several trees in my garden. Formerly I always protected them, and did not allow them to be molested; but I find that confidence in them has been misplaced. They destroyed a large, handsome mountain ash tree in my yard, and I believe another will die. I have only saved the trees by killing every Sapsucker coming near them. Where they only partly circle the tree it only stops its growth, but where they entirely girdle a limb or the trunk in several places, and close together, it stops the flow of the sap and it soon dies. I have examined into the matter very closely and there is no doubt of the cause."

I consider the Yellow-bellied Sapsucker the commonest Woodpecker in the Adirondack wilderness, in New York. Its ordinary call note is a whining "whäee," and it utters a number of other sounds, some of these resembling the calls of the Blue Jay, and others those of the Red-shouldered Hawk. During the mating season, when the sexes are chasing each other, a series of notes like "hoih-hoih," a number of times repeated, are frequently heard. Although generally disposed to be more or less noisy, while clinging to their food trees they are nearly always silent as far as my observations go. On June 25, 1892, in the woods in Herkimer County, New York, I noticed a series of drinking holes in a sugar maple standing close to the edge of a swamp, which ran up and down, on one side of the tree only, for a distance of 3 feet. These drinking places were visited by different birds at short intervals. All were silent while at the tree, excepting one, a male, which always made a peculiar snorting or purring sound when alighting. There were three rows of holes, each about an inch apart, running parallel to each other, and these were separated about every 6 inches by an untouched space some 3 inches wide. On June 24, 1892, I noticed a nest of this species in the trunk of a dead maple, about 40 feet from the ground, near Wilmurt, New York. It contained nearly full-grown young, which kept up an almost constant clamor for food while I was watching them. In the Adirondacks they prefer ash and butternut trees to nest in, but elms, birches, and maples are also frequently selected for this purpose, while in the river bottoms in Illinois and Indiana they often breed in willows or cottonwoods. Solid dead trees seem to be preferred; if a living one is selected it is usually one in which the core is decayed. The nesting sites vary from 8 to 50 feet in height from the ground, being usually about 25 feet up, and these are either excavated in a dead limb or the main trunk of the tree; if in the latter, frequently directly under a limb, which affords some protection against storms. They are rather tame and fearless about their homes, and generally allow themselves to be closely approached.

While in the woods one morning, seated against the trunk of a maple, observing the movements of a Winter Wren and her brood, a male Yellow-bellied Sapsucker suddenly flew down from a neighboring tree and alighted on the side of the one on which I was leaning, within a foot of my head. He startled me not a little, and no doubt he was equally astonished, as he remained only about a minute, and, uttering a sharp note, like "huwy," beat a hasty retreat. Its favorite resorts during the breeding season are deciduous and mixed woods, generally close to water, in river bottoms, along the shores of the numerous lakes and the borders of swamps, while it is much less frequently seen at this season of the year in extensive coniferous forests.

In the more southern portions of its breeding range nidification usually commences about the beginning of May, and somewhat later farther north. It takes about a week or ten days to complete the excavation for a nesting site, which is usually gourd-shaped, varying from 6 to 18 inches in depth. The entrance hole is perfectly circular, about 1½ inches in diameter, and just large enough to admit the bird; the sides of the excavation are smooth, and a layer of fine chips is left in the bottom of the hole, on which the eggs are deposited. The sexes relieve each other in this work, and also share the duties of incubation. Several other fresh holes are usually excavated in the same tree, presumably by the male, to which he probably retires to rest during the night, and to guard his mate from possible danger.

Fresh eggs may be looked for during the latter half of May and the first week in June, and from five to seven are laid to a set, those containing five or six eggs being most common. An egg is deposited daily, and should the first clutch be taken, a second, usually containing four eggs, is laid about two weeks later, frequently in an excavation in the same tree. They are devoted parents, and when incubation is somewhat advanced, or the young have been recently hatched, the bird on the nest is loath to leave it, and will sometimes allow itself to be captured rather than to desert its treasures. The one off duty may also frequently be seen clinging just below the hole, and remaining in this position perfectly motionless for several minutes at a time, as if in a deep study. The eggs, like those of all Woodpeckers, are pure white in color, the shell is close-grained and only moderately glossy; in shape they vary from ovate to elliptical ovate, and occasionally to an elliptical oval.

The average measurement of seventeen eggs in the United States National Museum collection is 22.23 by 17.06 millimetres, or about 0.88 by 0.67 inch. The largest egg measures 23.37 by 17.53 millimetres, or 0.92 by 0.69 inch; the smallest, 20.57 by 16.26 millimetres, or 0.81 by 0.64 inch.

The type specimen, No. 24726 (not figured), from a set of six eggs, was taken by Dr. William L. Ralph, near Trenton Falls, Herkimer County, New York, on May 28, 1886, from a cavity in a rotten limb of an elm tree standing in an open field.[1]

[1] For further information on this species, I refer the reader to Mr. William Brewster's interesting article in the Bulletin of the Nuttall Ornithological Club, Vol. I, 1876, pp. 63–70; also, to one by Dr. C. Hart Merriam, published in the same Bulletin, Vol. IV, 1879, pp. 1–6; and to the careful observations made by the late Mr. Frank Bolles, published in the Auk, Vol. VIII, 1891, pp. 256–70, and Vol. IX, 1892, pp. 109–119.

## 35. Sphyrapicus varius nuchalis Baird.

RED-NAPED SAPSUCKER.

*Sphyrapicus varius* var. *nuchalis* Baird, Birds of North America, 1858, 103. (B 86, C 302*a*, R 369*a*, C 447, U 402*a*.)

Geographical range: Rocky Mountains and adjacent ranges from western Texas, Arizona, and New Mexico; north through Colorado, Utah, Nevada, Wyoming, Montana and Idaho, into the British provinces of Alberta and eastern British Columbia to about latitude 54° and probably farther; west to the Cascade Range in Washington and Oregon, and the Sierra Nevada in California, and in winter into Lower California and northern Mexico. Casually east to western Kansas (Wallace).

The breeding range of the Red-naped Sapsucker or Woodpecker appears to be principally confined to the higher mountain ranges of the interior from Colorado northward, as already indicated, and west to the eastern slopes of the Cascade Mountains in Oregon, Washington, and British Columbia. It is questionable if it breeds, to any extent at least, in the Sierra Nevadas, in northern California, or in the mountains of New Mexico, Arizona, and western Texas, where it seems to be only a migrant. Dr. Elliott Coues, however, in the "Proceedings of the Philadelphia Academy of Natural Sciences," January, 1866, records the Red-naped Sapsucker as a permanent and abundant resident in Arizona; but more recent observations made in various parts of this territory do not confirm this statement, and I believe it is only a rather rare migrant. Its summer home appears to be restricted to the borders of the numerous streams found throughout the mountains of the interior, including the eastern slopes of the Rocky Mountain system and those of the Cascades, at altitudes from 5,000 to 10,000 feet. It usually arrives on its breeding grounds about the first half of May, and the fall migration commences about October 1. Its general habits are similar to those of the preceding species, and in the fruit-growing sections within its range, in southern Utah, for instance, it is said to do considerable damage to the orchards in the early spring and again in the fall, tapping the peach and apple trees for sap in the same manner as *Sphyrapicus varius* does in the East. Its principal food consists of small beetles, spiders, grasshoppers, ants, and such larvæ as are to be found under the loose bark of trees, as well as of wild berries of different kinds.

Mr. F. Stephens writes me: "*Sphyrapicus varius nuchalis* is very rare in southern California. On November 2, 1891, a neighbor of mine shot a female of the year and brought it to me; he said that it was boring holes in the apple trees and had damaged one considerably. This is the only California instance of sap-sucking (in orchards) known to me." In a more recent letter he informs me that he met with this Woodpecker on Lassen Creek, in Modoc County, California, at an altitude of 5,600 feet, on August 2, 1894, obtaining both parents and a family of young of the year

Mr. W. G. Smith informs me that this Sapsucker is a common summer resident in Estes Park, Colorado, breeding from 7,000 feet up to nearly timber line, invariably nesting in live quaking aspens, between June 1 and 15.

The following is taken from an article of mine published in "The Auk" (Vol. V, 1888, pp. 226 to 229), with some slight alterations made in the text:

This race of *Sphyrapicus varius* I have met sparingly in various portions of the Blue Mountains of Oregon, Washington Territory, and Idaho, and as far west as the eastern slope of the Cascade Range in Southern Oregon, in the Klamath Lake region, where, however, it was rare and replaced by *Sphyrapicus ruber*, the two species overlapping each other, but not intergrading, and remaining perfectly distinct. I first met with the nest and eggs of this bird in a small aspen grove at the edge of a beautiful little park-like prairie, near the summit of the Blue Mountains, in Grant County, Oregon, on June 12, 1877.[1] I was escorting an army paymaster from Canyon City to Camp Harney, Oregon, where I was then stationed. After a laborious climb to the top of the steep mountain at the foot of which the little mining town of Canyon City nestled, I stopped for some twenty minutes to rest the animals and to eat lunch. The spot was a lovely one; the little grove at the edge of the heavy pine forest contained perhaps half a dozen aspens that measured a foot or more through, and a number of smaller ones. I had made myself comfortable under one of the largest ones, which stood on the outer edge of the grove, watching the horses enjoying the luxuriant grass, and was busily engaged in eating my lunch, sharing it with several Oregon Jays, *Perisoreus obscurus*, which were quite tame and absorbed my entire attention for some time. A Red-naped Sapsucker was, in the meantime, flying about my tree, alighting on others in the vicinity, and keeping up a constant chatter. I thought at first he was jealous of the Jays, and paid no attention to him, till he flew onto the tree I was sitting under, which brought out his mate. Their nesting site was directly over my head, about 20 feet from the ground, and I might have noticed it sooner by the fresh chips dropped by the birds in excavating the cavity, and which were lying all around me, had I not been entirely absorbed in watching the Jays, or 'Meat Birds,' as they are called there by the hunters and trappers. It did not take long for one of my men to climb up and chop a sufficiently large hole in the tree to insert the hand. The entrance to the excavation was exceedingly small, not over 1¼ inches in diameter, about 8 inches deep, and about 4 inches wide at the bottom. It contained three nearly fresh eggs, lying partly embedded in a layer of fine chips. About a year afterwards, when passing the same spot, June 2, 1878, I took another set of three fresh eggs of this species out of a hole in another, somewhat smaller aspen tree in the same grove. Although aspens of suitable size were to be found in several places in the immediate vicinity of Camp Harney, Oregon, which is located at the foot and on the southern slope of the Blue Mountains, at an altitude of about 4,800

[1] But I had previously found a nest with young in June, 1875, in the same locality, as well as several in 1876.

feet, I failed to find any of these birds nesting there, though they were met with by me at various times in the vicinity, and sometimes even quite a distance away from the mountains. They are only summer residents in that region, but an occasional straggler remains in sheltered locations throughout the winter. I am inclined to think that this bird is much more common in the Rocky Mountain region.

Mr. Denis Gale, of Gold Hill, Colorado, kindly furnished me with the following observations regarding this subspecies. He writes as follows:

"My observations have been that this subspecies invariably selects for its nesting site a living aspen tree. I have never met with it in any other. This tree favors the mountain gulches and low, sheltered hillsides, at an altitude of from 7,000 to 10,000 feet. Above this point they do not attain sufficient size, and are mostly dwarfed and scrubby. Here in Colorado *Sphyrapicus varius nuchalis* is seldom found above 9,000 feet or much below 8,000 feet. The aspen tree is short lived, and ere much of a growth is attained, a cross section, in the majority of instances, will show a discolored center of incipient decay, involving half or two-thirds of its entire diameter, with a sound, white sap zone on the outer circumference, next to the bark. This sound, healthy zone nourishes the tree until the decayed core discovers itself in some withered limbs, and frequently the top of the tree manifests the canker.

"Such trees the Red-naped Sapsucker selects for its nesting site, and with great perseverance chisels through this tough, sound zone, from 1 to 1½ inches in thickness, commencing with a very small hole and gradually extending its circumference with each stage of the deepening process, working from the lowest center out, till the exact circumference of the intended aperture of entrance is attained. In thus radiating in circles from the central point the minute chips are chiseled out with considerable ease. This mode of working is observed until the tough zone is worked through; what remains then is comparatively easy work; the soft, soggy, lifeless inside is worked into and downward with greater facility, and a roomy, gourd-shaped excavation quickly follows, the female doing the excavating from beginning to end, and, according to exigencies, completes it in from six to ten days.

"Some idea of the vitality and toughness of this zone of sap in a live aspen may be realized when it is stated that in a tree used consecutively for three or four years, if undisturbed, as is the general custom of *Sphyrapicus varius nuchalis*, the entire aperture will be almost closed by the recuperative agency of the sap which quickly heals and closes up the wound. No other Woodpecker will face such a formidable task. *Picus villosus harrisii* comes next as a borer; then follows *Sphyrapicus thyroideus*. Both of these species nest sometimes also in apparently live aspens, but upon close inspection such trees will be found to be badly decayed.

"*Sphyrapicus varius nuchalis* usually insists upon a new excavation each year. The height of the nesting sites from the ground varies from 5 to 30 feet; the full set of eggs is four or five in number; sometimes a smaller num-

ber of eggs mark a full set, presumably the nest of one of last year's birds. Fresh eggs may be looked for in Colorado from June 1 to 15, and should the first set be taken, a second one may generally be found from ten to fifteen days later; and, as a rule, the second nesting site will not be greatly distant from the first one. Several nests of this species may be found within a short distance of each other in the same aspen grove."

My own limited observations during the breeding season bear out Mr. Gale's statements completely, viz, that this species breeds exclusively in live aspen trees. Dr. J. C. Merrill, United States Army, in "Bulletin Nuttall Club," October, 1881, states, however, that he found a nest of these birds in a dead cottonwood tree in Montana. In southwestern Oregon, in the mountain parks of the Klamath Lake region, these birds breed sparingly at as low an altitude as 5,000 feet, and it is more than probable that at a higher one, near the summit of the Cascade Range, they may be quite common.

In the Blue Mountain region, in eastern Oregon, I found them breeding only in the single locality already mentioned, at an altitude from 6,000 to 7,000 feet. During the winter months, I have occasionally observed a Red-naped Sapsucker in the Harney Valley, in Oregon, busily engaged in hunting for food among the willow thickets found growing along the banks of the small streams in that sagebrush-covered region, often long distances away from timber of any size. In *Sphyrapicus varius nuchalis* the red or crimson markings found about the head and throat of adult birds are usually wanting in the young birds of the year, or else are replaced by a pale, claret-colored tinge on the corresponding parts. The black on the back and wings is also duller and not so deep, and the general pattern less distinct.

I believe that both sexes assist in the labor of excavating the nesting site, the female appearing to do the greater part of the work, however, which is frequently very laborious, and that the male also shares the duties of incubation, which lasts about fourteen days. The number of eggs to a set varies from three to six, usually four or five; these are mostly ovate in shape, a few are elliptical ovate; they are pure white in color; the shell is fine grained and moderately glossy.

The average measurement of thirty-five specimens in the United States National Museum collection is 22.78 by 17.07 millimetres, or about 0.90 by 0.67 inch. The largest egg of the series measures 24.13 by 18.29 millimetres, or 0.95 by 0.72 inch; the smallest, 20.83 by 16.76 millimetres, or 0.82 by 0.66 inch.

The type specimen, No. 19415 (not figured), from a set of three eggs, was taken by the writer on the summit of the Blue Mountains, in Grant County, Oregon, as previously described, on June 12, 1877.

## 36. Sphyrapicus ruber (Gmelin).

RED-BREASTED SAPSUCKER.

*Picus ruber* Gmelin, Systema Naturæ, I, 1788, 429.
*Sphyrapicus ruber* Baird, Birds of North America, 1858, 304.
(B 87, C 302*b*, 303?, R 369*b*, C 448, U 403.)

Geographical range: Pacific Coast districts, from northern Lower California through California, Oregon, Washington, and British Columbia; north to southern Alaska; east mainly to the western slopes of the Sierra Nevada, and on both sides of the Cascade Mountains in Oregon, Washington, and British Columbia.

The Red-breasted Sapsucker or Woodpecker is only a summer resident from northern California northward, and a resident throughout the balance of its range in the Sierra Nevadas, in the southern half of this State. Mr. H. W. Henshaw found it near Fort Tejon in August, 1876, taking a young bird there and seeing several others. Mr. F. Stephens writes me: "I saw one in June in the San Bernardino Mountains, where it probably breeds, and consider it as a rather rare winter visitant near the coast."

Mr. L. Belding says: "A common summer resident in the fir forests of the Sierra. Like nearly all the California Woodpeckers, it is found lower down in the winter, then becoming rather common in the foothills, although rarely seen in the valleys. I have seen a considerable number of its burrows in Calaveras, Tuolumne, Alpine, Butte, and other counties. They are rarely below 30 feet, and are often overlooked or found with some difficulty, as they frequently are in bark-covered trees. It was noticed at Sierra Valley and Donner Lake."[1]

Mr. Charles A. Allen, of Nicasio, California, writes me: "These Woodpeckers are very fond of hanging to telegraph poles, and may be found drumming along the line of the Central Pacific Railroad through the Sierra Nevadas, where you can hear them beating a tattoo for hours at a time. If you try to approach one, as soon as a certain distance is reached the bird will sidle to the opposite side of the pole, and then keep peeping around the corner at whatever has excited his suspicions, and as soon as it thinks it has a good opportunity to escape it will fly away with a shrill cry, and keep the pole in line between it and yourself for protection. Here they are very shy, and remain very quiet if discovered. They feed their young on black ants and other insects, which they pick out of decayed trees."

Dr. Clinton T. Cooke found the Red-breasted Sapsucker moderately common in the vicinity of Salem, Oregon, and took two sets of eggs from dead cottonwoods, one set containing five fresh eggs, on May 12, 1888, the other, also of five, on May 15, 1891, in which incubation had commenced. The nesting sites were situated 20 and 25 feet from the ground. Mr. A. W. Anthony writes me that this species was rather common in Washington County, Oregon,

[1] Land Birds of the Pacific District, California Academy of Sciences, II, 1890, pp. 66, 67.

in 1885. He located two pairs in a grove of alders, and another was found excavating a nesting site in a big fir stub, fully 50 feet from the ground, on April 10. They seemed to prefer the orchards to the forests, although they were often seen in the maples. He also observed it in March near Ensenada, Lower California.

Mr. R. H. Lawrence met with this species at Ridgefield, Washington, on October 2, 1892. Mr. R. MacFarlane found it breeding near Fort St. James, Stewart Lake, British Columbia, on May 25 and 31, 1889, and sent eggs of this species, and also a young bird of the year, taken near Babine, somewhat farther north, to the United States National Museum. It reaches the northern limits of its breeding range in southern Alaska. A specimen taken on June 5, 1882, near Fort Wrangel, by Mr. W. A. Jones, is now in the United States National Museum collection.

The following account is taken from my article on this species published in "The Auk" (Vol. V, 1888, pp. 229–234), only a few changes being made in the text:

In my various travels throughout the interior of Oregon, Nevada, Washington, and Idaho, covering over fifteen years, I never met with this bird till the summer of 1882, when I was ordered to take station at Fort Klamath, located near the northern end of Klamath Lake, in the southwestern part of Oregon. Here I found the Red-breasted Sapsucker an abundant summer resident, and I have no doubt a few of these birds winter in the more sheltered portions of the deep canyons of the lower Klamath River region. They are among the earliest birds to arrive in the spring. The first bird of this species shot by me, in the spring of 1883, was obtained on March 13, and I have seen a few as late as November. On one of my collecting trips, the morning of April 4, 1883, while riding through a patch of pine timber, near Wood River, the principal stream running through the center of Klamath Valley, I noticed a flock of these birds, at least twenty in number. They were very noisy, apparently glad to get back to their summer homes, and seemed to have an excellent time generally, flying from tree to tree and calling to each other.

As I wanted a couple of specimens, I was compelled to disturb their jollification; those procured were both males, and presumably the entire flock belonged to this sex. By April 20 they had become very common, and some pairs at least were mated and had already selected their future domiciles, in every case a good-sized live aspen tree. The males might at that time be heard in almost all directions drumming on some dry limb, generally the dead top of one of these trees. They scarcely seemed to do anything else. At least five pairs nested within half a mile of my house, and I had excellent opportunities to observe them. Some birds, apparently more industrious than others, would not be satisfied with one hole, and excavated several, sometimes all in the same tree; others contented themselves with a single one. It is possible that the extra ones, after being begun, were abandoned, either being found to be too damp inside or for some other cause unknown to me; or they may have been

made by the male for his own use to pass the nights in and be close to his mate in case of danger; or, again, just to keep his bill in chiseling practice. I am myself inclined to think that the female does nearly, if not quite all, the work on the cavity in which she deposits her eggs.

These birds are not at all shy during the breeding season, allowing you to approach them closely; but they have an extraordinarily keen sense of hearing. I frequently tried to sneak up to a tree close to my house which I knew had been selected by a pair of these birds, to watch them at work, but I was invariably detected by the bird, no matter how carefully I tried to creep up, before I was able to get within 30 yards, even when she was at work on the inside of the cavity and could not possibly see me. The bird would cease working at once, her head would pop out of the hole for an instant, and the surroundings be surveyed carefully. If I kept out of sight and perfectly still, she would probably begin working again a few minutes afterwards, but if I moved ever so little, without even making the least noise, in my own estimation, she would notice it and stop working again at once. If the tree were approached too closely, she would fly off, uttering at the same time a note resembling the word 'jay,' or 'chäe,' several times repeated, which would invariably bring the male around also, who had in the meantime kept himself busy in some other tree, either drumming or hunting for food. While the female was at work on the inside of the excavation the male would fly to the entrance, from time to time, and look in, probably asking his mate how her work was coming on, how soon they might begin housekeeping, etc.; and at other times he would hang, for five or ten minutes even, just below the entrance to the burrow, in a dreamy sort of study, perfectly motionless and seemingly dazed, evidently thinking of the family responsibilities that were soon to come.

I am inclined to think that this species does not indulge in the habit of girdling trees for the sap and the soft inner bark (*cambium*) to the same extent that *Sphyrapicus varius* does—at any rate, not during the breeding season. These birds were, as I said before, extremely abundant in the vicinity of Fort Klamath, and this being the case, evidence of their work in this direction should have been rather common. I do not remember having seen more than two instances showing extensive and systematic signs of girdling—one, a medium-sized cottonwood limb, showed the punctures all over for a distance of 3 feet; the other, a species of mountain ash, on which none of the shoots were over 3 inches through, had been riddled all over by the birds. These mountain-ash shrubs, none of which grow to any size, were rare, however, in that vicinity.

Throughout its range I think this species breeds frequently at lower altitudes than *Sphyrapicus varius nuchalis*. Fort Klamath, however, although but 4,200 feet above sea level, has a very cool summer climate, frosts occurring in almost every month of the year. The surrounding country is very beautiful at that time. Heavy, open forests of stately pines and firs, among these the graceful and beautiful sugar pine, are found on the mountain sides and reaching well down into the green, park-like valleys. Interspersed here and there are aspen

groves of various extent, their silvery trunks and light-green foliage blending artistically with the somber green of the pines. These aspen groves are the summer home of the Red-breasted Sapsucker.

As far as my own observations go, healthy, smooth-barked aspens are always selected as suitable nesting sites by these birds. The trees used vary from 12 to 18 inches in diameter near the ground, and taper very gradually. The cavity is usually excavated below the first limb of the tree, say from 15 to 25 feet from the ground. The entrance hole seems to be ridiculously small for the size of the bird—perfectly circular, from $1\frac{1}{4}$ to $1\frac{1}{2}$ inches in diameter only—so small, indeed, that it seems as if it took considerable effort for the bird to squeeze himself in and wriggle out of the hole.

The gourd-shaped excavation varies in depth from 6 to 10 inches, and it is from 3 inches near the top to 4 or 5 inches wide at the bottom. The finer chips are allowed to remain in the bottom, forming the nest proper, on which the eggs are deposited. Frequently they are more than half covered by these chips. The interior of the entire excavation is most carefully smoothed off, which must consume considerable time, considering the tough, stringy, and elastic nature of the wood when filled with sap, making it even more difficult to work when partly decayed, which seems to be the case with nearly all aspens of any size. Probably eight or ten days are consumed in excavating a satisfactory nesting site. All the larger and coarser chips are dropped out of the hole and scattered about the base of the tree. From the quantity of these found under every tree occupied by these birds during the nesting season of 1883, I am inclined to believe that they are only satisfied with an entirely new nesting site every year, and not simply with an old one repaired to answer the purpose. These same chips are an extremely simple and sure guide to their nest.

In hunting for them I looked for the chips on the ground first, and after finding these it did not take long to find the hole from which they came. In this manner it was an easy matter to find their nest, and I took no less than fifteen sets of their eggs in a single season, and might have taken more had I been so inclined, especially by following up the birds for their second set, where they had been robbed previously. Ordinarily but one brood is raised in a season.

The number of eggs varies from five to six to a set. Full sets of fresh eggs may be looked for in that locality from May 20 to June 5, and I have taken nearly fresh eggs as late as June 13. I took my first set on May 23, 1883. It contained six fresh eggs, and the cavity was about 7 inches deep, the entrance about 8 inches below and directly under the first limb of the tree, as usual a live aspen, about 18 feet from the ground. While the nest was being rifled of its contents both parents flew about the upper limbs of the tree, uttering a number of different sounding, plaintive cries, like 'peeye,' 'pinck,' and 'peurr,' some of these resembling somewhat the purring of a cat when pleased and rubbing against your leg. I used to note the different sounds in a small note-

book at the very time, but scarcely ever put them down alike; each time they appeared a trifle different to the ear, and it is a hard matter to express them exactly on paper.

The eggs, when fresh and before blowing, like those of all Woodpeckers, show the yolk through the translucent shell, giving them a beautiful pinkish appearance, as well as a series of straight lines or streaks, of a more pronounced white than the rest of the shell, running toward and converging at the smaller axis of the egg. After blowing, the pink tint will be found to have disappeared and the egg changed to a pure, delicate white, the shell showing a moderate amount of luster. There is considerable variation in their shape, running as they do through all the different ovates to an elongated ovate.

Both sexes assist in incubation, which lasts from twelve to fourteen days, I think. Their food consists principally of grubs, larvæ of insects, ants, various species of lepidoptera, which they catch on the wing, like Flycatchers, and berries. Of the latter quite a number of different edible species are found about Fort Klamath, and they seem to be especially fond of wild strawberries, which grow there in abundance The young, after leaving the nest, stick to the tree in which they were hatched for the first day or two, without venturing to fly.

The beautiful carmine or crimson on the head and breast in the adults is replaced by claret-brown in the young, varying in amount and intensity in different individuals; in some it is very distinct and prevalent. The yellow, so plainly noticeable on the belly of adult birds, is also wanting in the young. The colors throughout are much duller and the general pattern less distinct. By the latter part of September the majority of these birds leave for their winter haunts, only a few stragglers remaining. These are possibly birds that breed farther northward and winter in the warm valleys of northern California, and are then comparatively near the end of their migration, remaining in the Klamath Valley region, where there is always an abundance of food for the Woodpecker family, judging from the number of different species of these birds found there throughout the year, till the heavy winter snows drive out the less hardy, among which the Red-breasted Sapsucker must be included.

While stationed at Fort Klamath, Oregon, I took especial pains to collect a good series of both adult and young birds of this species, as well as a number of sets of their eggs, and devoted considerable time, at no little inconvenience to myself, to observe their general habits closely. Although my personal observations differ materially from those of other naturalists (see 'History of North American Birds,' by Baird, Brewer, and Ridgway, Vol. II, pp. 544 and 545), I am confident that they will be found substantially correct by future observers.

The average measurement of seventy-two specimens in the United States National Museum collection is 23.37 by 17.58 millimetres, or about 0.92 by 0.69 inch. The largest egg of the series measures 25.40 by 17.78 millimetres, or 1.00 by 0.70 inch; the smallest, 21.84 by 17.27 millimeters, or 0.86 by 0.68 inch.

The type specimen, No. 19395 (not figured), from a set of six eggs, was taken by the writer near Fort Klamath, Oregon, on May 23, 1883.

## 37. Sphyrapicus thyroideus (Cassin).

WILLIAMSON'S SAPSUCKER.

*Picus thyroideus* Cassin, Proceedings Academy of Natural Sciences, Philadelphia, 1850, 1851, 349.

*Sphyrapicus thyroideus* Baird, Birds of North America, 1858, 106.

(B 88, 89; C 304, 305; R 370; C 449; U 404.)

Geographical range: Western North America; from the eastern slopes of the Rocky Mountains west to the Pacific coast, and from Arizona and New Mexico northwestward to southern British Columbia; east, in winter only, to western Texas (Concho and Tom Green counties); south to Jalisco, Mexico.

The southern limits of the breeding range of Williamson's Sapsucker, also known as the "Black-breasted," "Brown," and "Round-headed" Woodpecker, as far as they can be defined at present, extend through the higher mountain ranges of northern New Mexico, such as the Black and Culebra mountains, the Mogollon and San Francisco mountains of Arizona, and northward along the eastern slopes of the Rocky Mountains, where it has as yet been found breeding only in Colorado. However, as several specimens have been taken on Laramie Peak, in southeastern Wyoming, in August, this would indicate that it breeds at least as far north in this direction. I have been unable to find any records for Montana. The northern limits of its summer range on the Pacific Coast include southern British Columbia, where it has been taken near Similkameen in June, 1882, and it breeds throughout the Cascade Mountains of Washington and Oregon and southward through the Sierra Nevadas, in southern California.

Mr. F. Stephens writes me: "I have found *Sphyrapicus thyroideus* feeding their young in Taquitch Valley, in the San Jacinto Mountains, in southern California, on June 20, 1893, at an altitude of about 7,500 feet, and shot the female. The nest was some 45 feet from the ground, in a dead and broken fork of an otherwise green fir. The nest contained three young, one of which laid dead and decomposing in the bottom of the nest; the others were but a few days old. In the week following I saw several more adults of this species, between 7,500 and 8,500 feet altitude, and succeeded in shooting two more. The locality where they were obtained is in about latitude 33° 50′. I have also taken it near Fort Bayard, New Mexico."

Mr. Robert Ridgway obtained specimens near Carson City, Nevada, and at Parley's Park, in the Wahsatch Mountains, in Utah, where it is known to breed, and Mr. H. W. Henshaw found it to be a fairly common summer resident in the mountains near Fort Garland, in southern Colorado.

Mr. W. G. Smith writes me: "Williamson's Sapsucker is a common summer resident in Estes Park, Colorado, where it nests mostly in dead pines, often within a few feet of the ground, and again as high as 70 feet up. Full sets of fresh eggs are usually found here during the first week in June. The male appears to me to do most of the incubating, and hereabouts it is most often found at altitudes between 7,000 and 8,000 feet, but I have also taken it at much higher ones, where it nests somewhat later."

Mr. Lyman Belding, in his "Land Birds of the Pacific District," speaking of this species, says: "Tolerably common from about 7,000 feet upward in summer, often breeding in living tamaracks and covered with their resinous juice. In winter down to about the lower edge of the sugar pine (*Pinus lambertiana*), altitude about 2,500 feet, but rare here, and mostly female or young birds found so low, while at Big Trees, Calaveras County, California, January 6–13, 1879, I got thirteen adult males. In the breeding season they are most numerous in the valleys, as at Bloods, Hermit Valley, Blue Lakes, etc. Their burrows vary from 5 to 6 feet up to 30 or 40 feet. The young were still in their nests at Bloods, July 21, 1880, but in 1881 they were about a month earlier."[1]

The following account is taken from my article on this species published in "The Auk" (Vol. V, 1888, pp. 235–239), a few alterations being made in it:

This interesting Woodpecker is so unique in the entire difference of coloration of the sexes that for a long time they were considered and described as separate species. It remained for Mr. H. W. Henshaw, when attached as naturalist to Lieut. George M. Wheeler's expedition, engaged upon the geographical exploration of Colorado and New Mexico, in 1873, to establish their identity, he finding the supposed two species paired and breeding, near Fort Garland, Colorado, in June of that year. Like *Sphyrapicus varius nuchalis*, it has an equally wide and extended range, reaching from the eastern slopes of the Rocky Mountains to the western spurs of the Sierra Nevada and Cascade ranges in California and Oregon. In its habits, however, it differs considerably from the three other species of the genus *Sphyrapicus*, all of which seem to prefer regions abounding in deciduous trees, and using these, as far as at present known, almost exclusively for nesting purposes, while Williamson's Sapsucker gives the preference to coniferous forests, selecting pines to breed in, at least as frequently as aspens, and, according to my own observations, oftener than the latter.

Although it undoubtedly occurs in the region intervening between the Rockies on the east and the Cascades on the west, I can not positively recall a single instance where I have seen this bird in the entire mountain system, beginning at the Bitter Root Range, in Montana, in the east, following the continuation of this through the Blue Mountains of Washington and Oregon, as well as in most of the Salmon River mountain country in Idaho, till I first met with it on the eastern slopes of the Cascade Range, near Fort Klamath, Oregon, in the autumn of 1882. It was here Dr. J. S. Newberry obtained the type of the so-called '*Sphyrapicus williamsoni*.' Here I saw it for the first time on September 23, and as late as November 8 of the same year, taking specimens on both dates. Strange to say, all the birds I saw and secured for a period covering about five weeks, at that time, were females; and I only succeeded on October 28 in seeing and obtaining my first male of this species. It was taken under rather peculiar circumstances. I had only to walk a couple of hundred yards from my house to find myself in a fine, open pine forest. Gun in hand, I, as usual, took a short stroll that morning, following close along the banks of Fort Creek, directly east

[1] Occasional Papers, California Academy of Sciences, II, 1890, pp. 67, 68.

of the Post, and I had not proceeded more than half a mile from my house when I saw two males chasing each other about a dead pine stump, and uttering at the same time shrill cries. These cries attracted my attention to the birds. I tried to get within ordinary shooting distance, but they took alarm and flew in opposite directions before I was near enough. Nevertheless, I took a snap shot at the one nearest to me; but it continued its flight, apparently uninjured, crossing the creek, about 60 yards in advance of me, which was too deep and cold for me to ford, and, much to my disgust, disappeared in the heavier pine timber on the opposite side, without stopping while it was in sight. As it was useless as well as impracticable to follow this one, I kept on in the direction the other had taken, but failed to see it again. Fully an hour afterwards, on my way back to the Post, and when within a few yards of the place where I first noticed the two birds; tired out and disgusted, I sat down on an old log and was taking a rest, absorbed in reflections on my bad luck, when, from quite a distance, I noticed a black-looking bird flying toward me, coming from the opposite side of the creek, and from the same direction the one I shot at had taken earlier in the morning. Its flight was so peculiar and strange, constantly sinking, that I refrained from shooting when it first came within range. No wonder; it was its last expiring effort, and it actually dropped within a yard of where I was sitting. It was unquestionably the very bird I had shot at more than an hour before; no one else was out hunting at the time, as no other shots were heard. A single No. 12 pellet had penetrated the lungs, and the bird, in its dying struggle, had evidently tried to reach the same stump again on which I first noticed it.

My earliest record for 1883, on which date I obtained a male specimen, was March 20. It seems to me to be a more solitary bird than *Sphyrapicus ruber*. I never saw more than two together or in close proximity of each other. It is also more shy, and does not allow itself to be approached so readily as either of the preceding species. Its breeding range extends, near Fort Klamath, from an altitude of about 5,000 feet to the higher peaks of the Cascade Range, which attain in that vicinity a height of about 9,000 feet. On the mountain slopes about Crater Lake it seems to be most abundant, but not as much so as is *Sphyrapicus ruber* in the lower valley, where almost every aspen grove harbors a pair of these birds.

Crater Lake itself is such a strangely interesting and unique freak of nature, the peer in sublime grandeur of the Yosemite Valley, in California, and the Yellowstone Park, with its grand canyons and geysers, in Wyoming, and so little known withal, that I will give a short description of it as it appeared in "The Auk:" "The lake is about 7½ miles long and 6 wide, and unlike anything found in this or any other country. It is situated on the summit of the Cascade Range, about 25 miles north of Fort Klamath, at an altitude of about 7,500 feet; the highest peak in the vicinity reaches up to 9,000 feet. The rocky walls surrounding it on all sides are nowhere less than 1,000 feet and in places more than 2,000 feet high, at many points almost perpendicular, so that a stone can

be thrown without striking anything on its way till it reaches the water, fully 2,000 feet below. It is said to be some 1,800 feet deep, and in places is probably more. One can not realize the magnitude of this hole in the ground without seeing it. A mountain the size of Mount Washington, the highest peak of the White Mountains, in New Hampshire, might be dumped into it and not fill it up then. The water is beautifully clear and deep azure blue in color; the only living thing seen near it on a visit to the lake on July 27, 1882, was a solitary female Wandering Tatler (*Heteractitis incanus*), apparently very correctly named. An island, covered with good-sized trees, rises out of the water to a height of nearly a thousand feet, on the west side of the lake. It is composed mostly of volcanic scoriæ and pumice, and evidently was the principal cone of the now extinct crater, traces of whose activity in former times, in the shape of heavy pumice deposits, can be found for 50 miles inland to the east, on the road from the Deschutes River to Fort Klamath. There is only one place from which the shore of the lake can be reached with comparative safety, and even from there it is by no means an easy matter."

Mr. Gale, who is quite familiar with this species, writes me that in Colorado they nest sometimes at an altitude of 10,000 feet, and that they are generally distributed between that limit and 8,000 feet. The nesting sites, he says, are as often met with in moderately thick woods as in the more open clearings and isolated pine trees and shrubs, the only condition guiding their choice of a home being a shelter from the strong west winds. My own observations agree pretty well with his. He says: "A marked peculiarity I have noted with *Sphyrapicus thyroideus* is that the male takes a lookout station upon some suitable tree, where, at the approach of any possible danger, he gives the alarm by striking a short dry limb with his bill, by which a peculiar vibrating sound is given out, which the female, not very distant, fully understands, and is at once on the alert. If either excavating, guarding, or covering her eggs, she will immediately look out of her burrow, and, should the intruder's path lie in the direction of her nest, she will silently slip away and alight in a tree some distance off, but in view of both her nest and the intruder. The first or second blow of a hatchet upon the tree trunk in which the nest is excavated will mark her movement again by a short flight, so managed as not to increase the distance—in fact oftener coming nearer. When satisfied that her treasures have been discovered, she utters a peculiar, low, grating sound, not unlike the purring of a cat. The male then comes to the fore and braving the danger, is very courageous, and, should the eggs be far advanced in incubation, he will even enter the nest when you are almost within reach of it. When the latter is rifled, he is always the first to go in and discover the fact, often passing in and out several times in a surprised sort of manner. The large, gaping opening made by the robber's hatchet he seems to ignore altogether. To him it seems impossible that a few minutes only suffices to cut through the wall of wood that took his mate as many days of hard labor to accomplish. Presently he is joined by the female, a joint inspection is made, a verdict of grand larceny quickly reached,

and the conclusion arrived at: 'Well, we shall have to try again, with the hope of better luck next time.'"

Nidification is similar to that of the other species of the genus, with the exception already mentioned, of the difference in the kind of trees preferred. The height of nesting sites varies considerably, say from 5 to 60 feet, and perhaps still more in exceptional cases. Fresh eggs may be looked for, according to altitude, from May 20 to June 15; on May 26, 1887, Mr. Gale took a fine set of six, which I judge to have been perfectly fresh, from the exquisite manner in which they are prepared.

I obtained my first set of eggs of this species on June 3, 1883, about 9 miles north of Fort Klamath, in the open pine forest on the road to Crater Lake. It consisted of five eggs, slightly incubated. The nesting site was excavated in a partly decayed pine whose entire top for some 20 feet was dead; the height of the excavation from the ground was about 50 feet. The man climbing the tree reported it to be about 8 inches deep and about 5 inches wide at the bottom, and freshly made. A second set, of six fresh eggs, was taken June 12 of the same year, about 12 miles north of the Post, at a still higher altitude than the first one. It came also out of a pine about 40 feet from the ground. A third nest, found a week later, near the same place, contained five young, just hatched. This nest was in a dead aspen, about 20 feet from the ground. Only one brood is raised, and, like the two other species, it is only a summer resident in the vicinity of Fort Klamath. Its food seems to consist almost exclusively of insects and their larvæ, various species of lepidoptera, and an occasional grasshopper. Berries, I think, are seldom eaten by them.

I have found fully fledged young in July; a young female, shot July 21, must have left the nest certainly by the beginning of the month. When the young are large enough to fly, they are not at all rare at the lower altitude of Fort Klamath. They show the same differences in coloration in the sexes in their first plumage, with the following exceptions: The young males lack the red on the throat, which is replaced by dirty white; the sulphur yellow on the lower parts is mostly wanting, a slight trace of it being noticeable on some specimens; and the black on the back is much duller. The young females differ likewise by the absence of yellow on the belly, the black patch on the breast is wanting, the markings and barrings on the upper parts are less distinct, and the colors generally duller. In its undulating flight from tree to tree this species utters a shrill note, like "huit, huit."

Williamson's Woodpecker winters in the lower valleys and foot hill regions in the southern half of California, and southward in the pine forests of Arizona, New Mexico, western Texas, and probably also in similar localities of northern Mexico. The number of eggs laid to a set varies from three to seven, sets of five or six being most often found. These, like all Woodpecker's eggs, are pure china-white in color; the shell is close grained, rather thin, and only slightly glossy. In shape they vary from ovate to elongate ovate, and a few approach an ovate pyriform, a shape apparently not found in the eggs of the other species of this genus.

The average measurement of thirty-four specimens in the United States National Museum collection is 24.20 by 17.19 millimetres, or about 0.95 by 0.68 inch. The largest egg of the series measures 25.40 by 17.78 millimetres, or 1.00 by 0.70 inch; the smallest, 22.35 by 16.51 millimetres, or 0.88 by 0.65 inch.

The type specimen, No. 19409 (not figured), from a set of five eggs, was taken by the writer near Fort Klamath, Oregon, on June 3, 1883.

## 38. Ceophlœus pileatus (Linnæus).

PILEATED WOODPECKER.

*Picus pileatus* Linnæus, Systema Naturæ, ed. 10, I, 1758, 113.
*C[eophlœus] pileatus* Cabanis, Journal für Ornithologie, 1862, 176.
(B 90, C 294, R 371, C 432, U 405.)

Geographical range: More or less irregularly distributed through the heavier wooded districts of North America, excepting Newfoundland, Labrador, the shores of Hudson Bay, and those portions of the Northwest Territory, in the Dominion of Canada, north of latitude 63°. In the United States, apparently absent or very rare in the southern Rocky Mountains, and in the Territory of Alaska. Rare or extirpated in the more thickly settled parts of the eastern United States.

The Pileated Woodpecker, also known in different sections as "Cock of the Woods," "Logcock," "Woodcock," "Black Log" or "Black Woodcock," "Johnny Cock," "Wood-hen," "Woodchuck," and, according to Mr. B. F. Gault, by the peculiar name of "Good-Gods" in southeastern Missouri, is generally resident and breeds wherever found, although in winter it may sometimes rove about more or less, according to the food supply. Throughout most of our Eastern States, north of latitude 39°, the Pileated Woodpecker is now somewhat rare, and here it is mainly confined to the heavily timbered bottom lands along the larger streams and the more thinly settled sections in the mountain regions, where in a few favorable localities it is still met with in small numbers.

In quite a number of our Southern States, however, it is far more common, and in suitable localities it may be called fairly abundant. This is especially the case throughout the greater part of Florida, as well as in portions of South Carolina, Georgia, Alabama, Mississippi, Louisiana, Arkansas, southern Missouri, the Indian Territory, and the greater part of Texas It is by no means rare in portions of the other Southern States, as it is well known to occur throughout North Carolina, generally below an altitude of 4,500 feet, and I have occasionally seen bunches of these birds, numbering from four to twelve, exposed for sale in the markets of Washington, D. C., which had been killed in some of the neighboring counties in Virginia, where this large and handsome Woodpecker appears to be considered as a game bird. I tried to eat one, when short of meat, while traveling through the Blue Mountains of Oregon, but I certainly can not recommend it. It feeds to a great extent on the large black wood ants, which impart to it a very peculiar, and to me an extremely unpleasant

flavor, a kind of sweet-sour taste, which any amount of seasoning and cooking does not disguise, and I consider it as a very unpalatable substitute for game of any kind.

In the Rocky Mountain regions of Arizona, New Mexico, Colorado, and Wyoming the Pileated Woodpecker apparently does not occur, and if it occasionally should, it must be considered very rare. The same remarks apply to Utah and the greater part of Nevada, but it is occasionally met with in the western part of the latter State. I found it quite rare also in Idaho, Oregon, and Washington, excepting in the coast regions of the latter States. In California it is not uncommon in portions of the Sierra Nevadas, while in British Columbia it appears to be far more abundant than anywhere else west of the Rocky Mountains, both on the coast and in the interior, especially in the vicinity of Lake Babine, in about latitude 55°, from which point Mr. R. MacFarlane sent a number of specimens to the United States National Museum in 1889. It has also been taken by Mr. B. R. Ross, of the Hudson Bay Company, at Fort Liard, in the extreme northeastern corner of British Columbia, and on Big Island, in Great Slave Lake, by Mr. John Reed, which marks the most northern point of its known range.

It can thus be seen that the Pileated Woodpecker is by no means distributed over the whole of North America, and that it is not found in many heavily timbered sections which appear to be equally suitable as a habitat as many of those which it occupies. It is eminently a bird of the more extensive forest regions, and is as much at home in a semi-tropical as in a cold climate. As a rule, specimens from the northern borders of its range are considerably larger than those from the south. There appears to be considerable difference in the habits of this bird; in some sections it is extremely shy and wary, while in others it is exactly the reverse.

Mr. Manly Hardy, of Brewer, Maine, writes me: "This splendid bird is not uncommon in the heavily timbered portions of our State, and, although usually very shy, becomes accustomed to man if not disturbed. I once had two so tame they would allow me to sit within 4 paces of them, and put my hand upon the tree when they were not 10 feet above my head. They usually select certain large dead hemlock trees to which they go almost daily, often remaining for hours, repeating their visits until the bark is almost entirely removed from the tree. It was owing to the proximity of several such trees to my home camp that I was able to become so familiar with them. They often chisel holes 6 or 8 inches deep in cedar and other soft-wood trees, and as large as the holes in a post-and-rail fence. I have seen one pick a large hole through 2 inches of frozen green hemlock to get at the hollow interior, and it seemed impossible that a steel tool of the same size could have done such work without being broken. They are easily called by clapping the hands so as to imitate their pounding. This requires skill, but I have taught others so that they have been successful in it. When called they seem to lose their usual shyness, and seem stupefied at not finding their mate, as they had expected. I have found them

nesting in the large yellow birch, and once found one late in the fall at work inside the tree, as I have often seen other species of Woodpeckers do in the fall; but whether working on next year's nest or providing a winter's retreat is unknown to me. Its food consists very largely of ants. In some cases it descends to the ground to obtain them, after the manner of the Flicker. I have seen them in Yosemite Valley and Calaveras Grove, California, and their actions and notes seemed exactly the same as in Maine birds.

"I once saw a Sharp-shinned Hawk persecute a pair of these Woodpeckers most persistently. They spent considerable of their time on some dead hemlocks close to my camp, and while busily at work the little Hawk would dart at one and follow him with his legs stretched out as if to seize him, all the time uttering a 'ca-ca-ca' to scare him. When the Woodpecker alighted and faced him from behind a tree, the former would also alight close by on some convenient limb, ready to repeat the performance as soon as the other commenced to work again. Sometimes the Woodpecker, instead of flying, would sidle around the body of the tree, and the Hawk would occasionally follow him twice entirely around before alighting to take a rest, only to make a fiercer dash next time. On some days this performance would be continued for at least an hour at a time, and the Hawk seemed to put in all the time he could spare from getting a living in annoying these birds. It was very evident, however, that he dared not seize one, as he easily could have done had he wished to do so. One would hardly think that a Pileated Woodpecker could catch on the side of a tree, swing his body around, and present his bill to the Hawk so quickly, but I saw this done dozens of times. The Sharp-shinned Hawk reminded me of some people who never can bear to see others getting an honest living.

"The Pileated Woodpecker is a constant resident in Maine, but rarely leaves the vicinity of large timber. It prefers places where large hemlocks abound, especially those localities where a few have been killed by camp building or small fires. In fall and winter a pair will regularly visit such trees every day for weeks, spending hours daily in stripping off the bark, until trees from 2 to 3 feet in diameter are often entirely denuded or large patches of the bare wood are exposed. In the spring I have often seen bushels of bark under a single tree."

Mr. R. S. Williams, of Columbia Falls, Montana, writes me: "*Ceophlœus pileatus* is rather common all through the timber of the Upper Flathead River region, in the northwestern part of the State. The bark of the western yellow pine seems to offer attractive foraging for these birds. One tree I observed, some 2 feet in diameter, is about stripped to the wood for 50 or 60 feet up. The birds strike their blows sidewise, splitting the bark off in thin scales that soon accumulate in large heaps at the base of the trees where they work. I ran across one bird obtaining his meal in a rather novel manner. He was eating the berries of a dogwood (*Cornus stolonifera*), and as the stem of the shrub was much too small for him to perch upright on, he allowed himself to swing

head downward, and, stretching his neck to one side, managed to reach the berries. Not unfrequently they search for food on the ground, usually alighting low down on a trunk and dropping backward, a few inches at a time, till they reach the base, where they search among the chips, etc., but constantly looking up with the most knowing glances, as if to say that they were not to be surprised in such a proceeding. I have never seen this species east of the Rocky Mountains in Montana."

I have seen this species in but few localities in the West, and with but one exception I always found the Pileated Woodpecker extremely shy and difficult to approach. In the latter part of June, 1882, I found a nest containing four young about one-half mile southeast from Fort Klamath, Oregon, and I noticed this family on several occasions afterwards in the heavy pine timber in the vicinity of the Post. These birds were not shy, and I could readily have shot them all, but refrained, hoping they would nest in the neighborhood again next season, which they, however, failed to do. The ordinary call note is a loud "cäck-cäck-cäck," several times repeated; another resembles the "chuck-up" of the Red-shafted Flicker, only somewhat slower, louder, and clearer; others again remind me of the cackling of a domestic hen. One of its love notes, according to Mr. A. Nehrling, sounds like "a-wuck, a-wuck," and one of alarm, or anger, like "ha-hi, ha-hi." It is very noisy during the mating season and indulges in a good deal of drumming at this time of year. I believe they remain mated through life, and pairs are more frequently seen than single birds.

Its food consists of the different species of boring beetles and their larvæ infesting timbered tracts, and of ants, many of which it captures on the ground; it also feeds on wild grapes, the berries of the black gum, dogwood, pokeweed, service berries, acorns, beechnuts, and chestnuts. Considered from an economic point of view, it does far more good than harm, and only attacks decaying and fallen timber. In the mountains of Oregon, and presumably in other localities, the Pileated Woodpecker is most frequently met with in the extensive burnt tracts, the so-called "deadenings," where forest fires have swept through miles of fine timber and killed everything in its path. Such localities afford this species an abundant food supply in the slowly decaying trees, and are sure to attract them. I have seen the sun obscured for weeks at Fort Klamath by the dense smoke caused by such a fire, which raged in the Cascade Mountains, near Diamond Park, some 50 miles north of the Post, in August, 1883. The bright scarlet crests of these birds were in former years highly prized by many of the Indian tribes in our Northwestern States, being used as ornaments on their war bonnets, and these birds were eagerly hunted for this purpose. Its flight is both strong and swift at times, but, as a rule, when at ease it is slow and crow-like, rather more direct and not so undulating as that of most of our Woodpeckers, and is often protracted for long distances.

In southern Florida the mating season commences early in March, and farther north, correspondingly later. A suitable tree having been selected, generally a dead one in large and extensive woods, both birds work alternately on the nesting site. This is usually excavated in the main trunk, from 12 to 75

feet from the ground, and it takes from seven to twelve days to complete it. The entrance measures from 3 to $3\frac{1}{2}$ inches in diameter, and it often goes 5 inches straight into the trunk before it is worked downward. The cavity varies from 7 to 30 inches in depth, and is gradually enlarged toward the bottom, where it is about 6 inches wide. A layer of chips is left at the bottom, on which the eggs are deposited. Occasionally the entrance hole, instead of being circular, is oval in shape, like that of the Ivory-billed Woodpecker. The inside of the cavity is quite smooth, the edges of the entrance are nicely beveled, and, taken as a whole, it is quite an artistic piece of work. Some of the birds, presumably such as have been molested previously, are quite shy and artful, removing every trace of chips as soon as loosened and dropping them in different places, at some distance from the nesting site, so as not to betray its location by the accumulation of chips at the base of the tree, and occasionally they show, if possible, still more intelligence. Dr. William L. Ralph tells me that in the spring of 1892 he found a nest of this species in Putnam County, Florida, where the bird is quite common, excavated in a dead cypress in swampy woods, which was comparatively easy to get at. He found this in the second week in April, about the time nidification is at its height there. On rapping on the trunk of the tree the bird, which was at home, stuck his head out of the hole and dropped some chips, naturally causing the Doctor to believe that the nesting site was still unfinished. The same performance was repeated on several subsequent visits, and finally he concluded to examine the nest anyhow, when he found nearly full-grown young. This pair of birds must have had eggs at the time he first discovered the nest, and the chips were simply thrown out as a ruse to deceive him.

The trees most often used for nesting sites are cypress, gum, pine, fir, tamarack, oak, sycamore, elm, birch, and cottonwood, and in southern Florida the trunk of the cabbage palmetto also furnishes suitable nesting sites. Besides the customary layer of chips found in the bottom of the hole, one of the nesting sites examined by Dr. Ralph contained fully a pint of clean sand. A fresh cavity is generally made each season, and this species also excavates others in the fall of the year to retire to during inclement and stormy weather in winter. On the data blank furnished by Dr. Ralph, for a set of three eggs taken by him in Putnam County, Florida, on April 20, 1892, from a hole in the side of a rotten pine stump, 27 feet above the ground, in low, flat pine woods, near a small swamp, I find the following entry: "This nest was examined April 13, but contained no eggs. At that time the cavity was opened by tearing out a piece about 3 inches wide from the aperture nearly to the bottom. The damaged place was repaired by nailing over it a piece of bark from the stump, with a small hollow in the top, to restore the opening to its proper shape." The cavity was about 18 inches deep. In northern Florida full sets of eggs may be looked for about April 15. Three eggs to a set seems to be the usual number found here, and most of the eggs in the United States National Museum collection came from this State. Dr. A. K. Fisher took a set of four at Lake George, Warren County, New York, on May 15, 1878; and Mr. J. Harris Reed,

of Beverly, New Jersey, writes me: "On June 4, 1893, in company with a friend, I discovered a nest of the Pileated Woodpecker, in Cape May County, New Jersey, containing five young birds. Our attention was attracted by the female, who, with food in her mouth, flew about us from tree to tree, very much agitated, and uttering a chattering note resembling that of a tree frog. Upon an examination of the surrounding trunks of dead trees, we located the nest, which was about 12 feet above the ground. Two of the young were removed and examined, they were nearly able to fly. Although we remained there nearly an hour watching the female through field glasses as she returned to the nest to feed her young, the male bird was not seen. This is the first occurrence of its breeding in this locality that I have met with."

From three to five eggs are usually laid to a set, but I have seen it stated that the Pileated Woodpecker often laid six, and that a nest found near Farmville, Virginia, contained eight. An egg is deposited daily, and incubation begins occasionally before the set is completed, and lasts about eighteen days, both sexes assisting in this duty, as well as in caring for the young. Like all Woodpeckers, the Pileated are very devoted parents, and the young follow them for some weeks after leaving the nest, until fully capable of caring for themselves. Only one brood is raised in a season. The eggs of the Pileated Woodpecker are pure china-white in color, mostly ovate in shape; the shell is exceedingly fine grained and very glossy, as if enameled; they are not as pointed as those of the Ivory-billed, and average smaller.

The average measurements of twenty-nine specimens in the United States National Museum collection, mostly from Florida, are 32.44 by 24.08 millimetres, or about 1.28 by 0.95 inches. The largest egg of the series measures 35.56 by 25.15 millimetres, or 1.40 by 0.99 inches; the smallest, 30.22 by 22.61 millimetres, or 1.19 by 0.89 inches.

The type specimen, No. 26529 (Pl. 1, Fig. 5), Ralph collection, from a set of three eggs, was taken by Dr. William L. Ralph, near San Mateo, Florida, April 13, 1893. It represents one of the larger eggs of the series.

## 39. Melanerpes erythrocephalus (Linnæus).

RED-HEADED WOODPECKER.

*Picus erythrocephalus* Linnæus, Systema Naturæ, ed. 10, I, 1758, 113.
*Melanerpes erythrocephalus* Swainson, Fauna Boreali Americana, II, 1831, 316.
(B 94, C 309, R 375, C 453, U 406.)

Geographical range: Temperate North America; from the southern United States north in the eastern provinces of the Dominion of Canada to about latitude 46°; rare or casual only in the maritime provinces; in the interior in Manitoba north to about latitude 50°; west, in the United States, to the eastern slopes of the Rocky Mountains from Montana to Colorado, western Kansas, the Indian Territory, and the eastern half of Texas. Casual in Utah (Salt Lake City) and southern Arizona (Chiricahua Mountains).

The Red-headed Woodpecker, one of the best known and handsomest species of the *Picidæ* found in the United States, is unquestionably the most disreputable representative of this family; but this fact does not appear to be very

generally known. Throughout the greater portion of the eastern United States it is a rather irregular resident. Many of these birds winter along our northern border, in certain years, when they can find an abundant supply of food; in fact, it is not unusual to find the Red-headed Woodpecker at such times in localities where snow falls to a depth of 3 feet and more. Throughout the western parts of its range, however, it appears to migrate pretty regularly, and it is rare to see one of these birds there, north of latitude 40°, in winter. In the eastern portions of the New England States, bordering the Atlantic Ocean, it is rather rare, and the same remarks apply to that part of New York east of the Hudson River, and to Vermont east of the Green Mountains, where it is only a casual summer visitor. Its breeding range is coextensive with its distribution. Birds that migrate usually return to their summer homes about the latter part of April or the beginning of May, and leave for the south again about the first of October. Their movements are very uncertain at all times, and are evidently regulated largely by the food supply; even on their breeding grounds, where they may be common one year, not a single pair may be found the next. Its favorite resorts in summer are the borders of woods, fringes of timber along streams, solitary trees in fields and pastures, shade trees along country woods, and on the treeless prairies of some of our Western States it contents itself with telegraph poles, fence posts, etc. In the South, newly cleared fields in which a number of dead, girdled trees still remain standing are much resorted to, and in such localities these birds are very abundant at almost all seasons, but especially in winter.

In summer the food of the Red-headed Woodpecker consists to a considerable extent of insects of different kinds, such as grasshoppers, ants, beetles, and flies, many of which are caught on the wing, and of such larvæ as may be hidden under the bark of trees, or in rotten wood; but it rarely digs out those of the wood-boring beetles which are found in more solid trees. At this season it also feeds largely on fruits and berries, such as cherries, apples, pears, figs, peaches, and grapes, as well as on blackberries, raspberries, mulberries, poke and elder berries, green peas, and Indian corn in the milk; and last, but not least, on young birds and eggs. In the late fall and winter its diet is more largely vegetable, one of its staples being beechnuts; the berries of the sour gum, dogwood, and palmetto are also largely eaten; acorns, Indian corn, and small grains are likewise used, and it is well known that these birds also store away supplies, consisting both of insects and vegetable matter, for winter use.

One of the strangest things in the life history of this species, so entirely different in every respect from the habits of all our other Woodpeckers, is the fact that it feeds on both the eggs and young of other birds. I would hesitate somewhat to record such an exceedingly pernicious habit if I had the least doubt as to it and had not personally witnessed it. I have been aware of the fact that it did sometimes throw out the eggs of other birds nesting in cavities in trees, since May 18, 1885, when I found a Red-headed Woodpecker rifling the nest of a Red-shafted Flicker near Fort Custer, Montana, where both these species were not uncommon. The cavity contained six fresh eggs, two of which had

already been thrown out, and I caught the Red-head in the act, coming out of the hole with his bill stuck through the third. At that time I simply considered this act on its part as a forcible appropriation of a coveted nesting site, as suitable trees were scarce in this vicinity, and thought no more about the matter. The next year I saw the following article in the "Oologist" (Vol. 3, April, 1886, p. 29), which I was rather reluctant to believe at first, written by a gentleman signing himself L. B. F., Augusta, Ga.:

"*Cannibalism of the Red-headed Woodpecker.*—I noticed two interesting incidents last spring connected with a Red-headed Woodpecker, which may interest the readers of the 'Oologist.' Early in May I found a nest of this bird containing six eggs, situated in the dead branches of an oak, 30 feet high. Near by a Crested Titmouse had industriously carved out his little home, in which he was feeding a nest full of young. A few days after, having taken the Woodpecker's eggs (I needed them for my collection), I was watching the Titmouse's nest to see him feed his little ones, when suddenly the owner of the robbed nest flew down and lit near the entrance to the nest of its neighbor, and thrusting his head inside, he deliberately drew out a young bird, carried it to a branch near by, and ate it. He and his mate repeated the same action until they had killed the whole brood; after which, having pulled out the lining of the nest, they flew away. This was very surprising to me, as I have never heard of Woodpeckers indulging in cannibalism before. But I had not yet done with the actions of the Woodpeckers. A week or so after having broken up the Crested Titmouse nest, I noticed the Red-heads repeatedly visiting the site of their old nest. This aroused my curiosity, and supposing they had decided to lay a new clutch, I visited the cavity to see whether my supposition was true. What was my surprise to find that the hollow contained not eggs, but the decaying body of a Great Crested Flycatcher. How it came there I know not; but I am fully convinced that the Red-heads visited the spot for the purpose of devouring the vermin which infested the decaying flesh."

A similar incident is recorded in the same periodical (Vol. 5, June, 1889, p. 113), where one of these birds was seen, near Hyde Park, Ontario, July, 1886, carrying away a freshly killed young robin. Mr. W. G. Smith, formerly of Loveland, Colorado, well known as a perfectly reliable and careful observer, writes me: "The Red-headed Woodpecker is a common summer resident in the lower foothills along the eastern slopes of the Rocky Mountains in this State, and I consider it a veritable butcher among our Nuthatches and Chickadees, driving every one away from its nesting sites, and woe to the bird that this villain can reach. It destroys both eggs and young, dragging the latter out of their nests and frequently leaving them dead at the entrance of their holes."

Mr. Howard Jones, Circleville, Ohio, I believe was the first naturalist to record the fact that this species robbed the nests of other birds of their eggs, and states how a colony of Cliff Swallows which had established themselves under the eaves of a large barn, near Mount Sterling, Ohio, was nearly exter-

minated by these pests. (See "Ornithologist and Oologist," Vol. 8, July, 1883, p. 56.) To these instances I will now add my own testimony, if further confirmation of the evil doings of this handsome freebooter is wanted.

On the evening of July 1, 1892, while walking with Dr. William L. Ralph along the border of an open piece of mixed woods, used as a pasture, near Holland Patent, New York, we noticed a Red-headed Woodpecker take something, apparently a bunch of moss, from a crotch of a maple and carry it to a fence post of an adjacent field. After worrying some time in trying to swallow something rather too large for his gullet, he finally succeeded, after an effort, and then worked some little time, evidently trying to secrete the remainder. Both of us had our field glasses and were watching the bird's actions closely. After some little time he flew back to the tree he had started from, while we proceeded to the fence post to investigate, and, much to our disgust and surprise, we found the freshly killed and partly eaten body of a young bird, almost denuded of feathers, securely tucked away behind the loose bark of the post. His victim was too much mutilated to identify positively, but looked like a half-grown Bluebird, whose head had been crushed in, the brain abstracted, and the entire rump and entrails torn out; the only parts left intact were the breast, upper part of the back, and the lower portion of the head. The missing parts had evidently just been eaten by the rascal while clinging to the top of the post, and the remnant was then hidden for future use. After carefully replacing this as nearly as possible in the position in which it was found, we returned; but I was interested enough to revisit the spot next morning, only to find that the Red-headed Woodpecker had evidently been there before me and breakfasted on the remains of the bird, as not a vestige of the victim was there to tell of the tragedy. It is sincerely to be hoped that all Red-headed Woodpeckers are not addicted to cannibalism; but when this matter is looked into more carefully I fear that this habit will be found not uncommon.

Its flight, like that of all Woodpeckers, is undulating and surging, and the bird looks especially graceful and pleasing on the wing. It is an adept flycatcher, and its vision is exceedingly sharp. A considerable portion of its food is picked up from the ground. I have seen one drop down from his perch on some dead limb, fully 20 feet overhead, pick up a small beetle out of the grass, fly back to its perch to eat it, and repeat the same performance as soon as another was espied. I have also seen them cling to the side of a tree or fence post, perfectly motionless, for fifteen minutes at a time.

Dr. William L. Ralph tells me that the Red-headed Woodpecker is the latest of these birds to arrive on its breeding grounds in Putnam County, Florida, where it rarely begins laying before May 1. It undoubtedly spends the winters in some other part of the State where the food supply is more abundant. It is known to breed throughout the South, from Florida westward through the eastern half of Texas, and to the foothills of the Rocky Mountains where it is fairly common, in suitable localities, from Colorado northward, but it has not yet been found in New Mexico. In the South it is stated to raise two

broods in a season, but in the northern parts of its range it raises only one. While stationed at Camp Harney, Oregon, I was much surprised to see a headdress of a prominent Pah-Ute chief profusely decorated with a number of the heads of the Red-headed Woodpecker, and I was led to believe that it might possibly occur in the vicinity, but learned subsequently that an enterprising Indian trader had imported a number of the skins from the East and sold them to the Indians at fancy prices. Mr. Robert Ridgway records having seen one near Salt Lake City, Utah, probably a straggler, and I know of only one other reliable record west of the Rocky Mountains, that of a bird taken by Mr. W. W. Price, in the Chiricahua Mountains, Arizona.

Like most Woodpeckers, the Red-headed is rather noisy during the mating season, continually frolicking and playing hide and seek with its mate, and when not so engaged, amusing itself by drumming on some resonant dead limb, or on the roof and sides of houses, barns, etc. It is a rather suspicious bird, but where not molested it will occasionally nest in close proximity to houses. Its ordinary call note is a loud "tchur-tchur;" when chasing each other a shrill note like "chärr-chärr" is frequently uttered, and alarm is expressed by a harsh, rattling note, as well as by one which, according to Mr. Otto Widmann, is indistinguishable from the note of the Tree-frog (*Hyla arborea*). He tells me that both bird and frog sometimes answer each other. I consider this species rather quarrelsome and domineering, both toward its own kind and with other birds, and see little in its general character to commend. From an economic view, it appears to me certainly to do fully as much if not more harm than good, and I consider it less worthy of protection than any of our Woodpeckers, the Yellow-breasted Sapsucker not excepted.

In the northern parts of its range nidification begins usually during the last week in May or the first week in June. Some of its nesting sites are exceedingly neat pieces of work; the edges of the entrance hole are beautifully beveled off, and the inside is as smooth as if finished with a fine rasp. The entrance is about $1\frac{3}{4}$ inches in diameter and the inner cavity varies from 8 to 24 inches in depth; the eggs are deposited on a layer of fine chips. It usually nests in the dead tops or limbs of deciduous trees, or in old stumps of oak, ash, butternut, maple, elm, sycamore, cottonwood, willow, and other species, more rarely in coniferous and fruit trees, at heights varying from 8 to 80 feet from the ground, and also not infrequently in natural cavities. On the treeless prairies it has to resort mainly to telegraph poles and fence posts, and here it also nests under the roofs of houses or in any dark corner it can find.

Incubation lasts about two weeks, and both sexes assist in this labor, as well as in the preparation of the nesting cavity; an egg is laid daily, and incubation sometimes commences before the set is completed. The young of this species are fed in the ordinary way, at any rate after they are half grown, the parents bringing their food in their bills. The number of eggs to a set varies from four to seven, sets of five being most frequently found, while occasionally as many as eight eggs have been taken from a nest. Mr. R. C. McGregor records taking

a set of ten eggs of the Red-head, varying in size from ordinary down to that of the Song Sparrow. Incubation varied from fresh in the smallest egg to advanced in the larger; the nest was in the end of a rotten limb of a large willow, about 20 feet from the ground. Locality, Crow Creek, Weld County, Colorado, May, 1887.[1] Like the eggs of all our Woodpeckers, they are pure china-white in color; the shell is fine grained and rather glossy, and when fresh they are quite translucent; they are mostly short ovate in shape, and show but little variation in this respect.

The average measurement of sixty eggs in the United States National Museum collection is 25.12 by 19.25 millimetres, or about 0.99 by 0.76 inch. The largest egg of the series measures 26.92 by 20.32 millimetres, or 1.06 by 0.80 inches; the smallest, 22.90 by 18.03 millimetres, or 0.90 by 0.71 inch.

The type specimen, No. 23423 (not figured), from a set of five eggs, was taken by Mr. C. W. Richmond, near Washington, D. C., June 23, 1885.

## 40. Melanerpes formicivorus bairdi Ridgway.

CALIFORNIAN WOODPECKER.

*Melanerpes formicivorus bairdi* Ridgway, Bulletin No. 21, U. S. National Museum, 1881, 34, 85.

(B 95, C 310, R 377, C 454, U 407.)

Geographical range: Northern and western Mexico, northern Lower California, and adjacent portions of the United States, from western Texas, New Mexico, and Arizona, north through California into western Oregon to about latitude 44°; east to the western slopes of the Sierra Nevada and Cascade mountains in California and Oregon. Sporadically on the eastern slopes of the Cascades in Lake and Klamath counties, Oregon.

In suitable localities, the Californian Woodpecker is one of the most abundant and familiar species along our southern border, and it is also rather common in many portions of California and western Oregon. Being essentially a bird of the oak belt, this handsome Woodpecker need only be looked for where these trees are abundant. In the northern portions of California and in southwestern Oregon it is rarely met with at a greater altitude than 4,500 feet, but in Arizona, New Mexico, and in northern Lower California it is often found at considerable distances above this point. In California it reaches the eastern limits of its range on the western slopes of the Sierra Nevadas, and in Oregon it rarely crosses over to the eastern slopes of the Cascades. As far as I have been able to ascertain, it reaches the northern limits of its range in Oregon, and it appears to be rare or entirely absent in the northwestern parts of this State. I have been unable to find a single reliable record of its occurrence in Washington, and do not believe that it has ever been met with so far north. It attains the eastern limit of its range, as far as known, in the Santa Fe Mountains, in northern New Mexico, where Mr. H. W. Henshaw secured several specimens, and it is also common in the Guadalupe and Davis Mountains, and

[1] The Oologist, vol. 5, March, 1888, p. 44.

in the hilly country in the vicinity of Harris Lake, near the head waters of the Guadalupe River, in Kerr County, Texas. A female, shot on November 25, 1894, in the vicinity of this lake, was recently sent me for examination by Mr. H. P. Attwater, of San Antonio, Texas, and he writes me that it is reported as fairly common there in winter, and may possibly also breed there. This, as far as I can ascertain, marks the most eastern point of its known range within our borders.

Messrs. L. Belding and A. W. Anthony both met with the Californian Woodpecker in northern Lower California, and it is well known to be a common inhabitant of many localities in northern Mexico. It is usually a resident and breeds wherever found, and it is generally more partial to the canyons and foothill regions than to the extensive level tracts and larger valleys.

The Californian Woodpecker is by far the most social representative of this family found within the United States, and it is no unusual occurrence to see half a dozen or more in a single tree. It is also a well-disposed bird, and seldom quarrels or fights with its own kind or with smaller species; but it most emphatically resents the thieving propensities of the different Jays, Magpies, and Squirrels, when caught trespassing on its winter stores, attacking these intruders with such vigor and persistency that they are compelled to vacate the premises in a hurry. Its manner of flight and call notes closely resemble those of the Red-headed Woodpecker, and, like it, it loves to cling to some convenient dead limb near the top of a tree and drum for hours at a time. It is one of the most restless Woodpeckers I know of, and never appears to be at a loss for amusement or work of some kind, and no other bird belonging to this family could possibly be more industrious. During the spring and summer its food consists, to a great extent, of insects, including grasshoppers, ants, beetles, and different species of flies, varied occasionally with fruit, such as cherries, which are carried off whole, apples, figs, and also berries and green corn; but acorns always form its principal food supply during the greater portion of the year, and large numbers are stored away by it in the thick bark of pines, as well as in dry and partly rotten limbs of oak and other trees, also in telegraph poles and fence posts. This peculiar habit of storing acorns in receptacles especially made for this purpose, and not under loose bark or similar hiding places, seems, however, to be principally confined to the birds found in California and southwestern Oregon, while it has not as yet been noted, to the same extent at least, in the somewhat smaller birds found in Arizona and New Mexico; and this habit is far too noticeable to have been overlooked by the many careful ornithologists who have visited Arizona since I was there in 1872 and 1873, and have had far better opportunities for observing its habits than I enjoyed. Although I traveled over considerable areas in both years where these birds were fairly common in places, I saw no evidence of their storing acorns in the way they do in the more northern parts of their range, though I must confess that I was then generally far more on the lookout for hostile Indians than ornithological matters.

Dr. E. A. Mearns, United States Army, separated the birds found in Arizona from those in California and Oregon, describing the southern form as *Melanerpes formicivorus aculeatus*, and taking into consideration the principal difference claimed by him, which appears to be constant, and also some apparent discrepancies in its general habits, I believe it is as well entitled to subspecific rank as not a few other now recognized subspecies. The most notable difference of this southern form from other recognized races of this species is the small size and peculiar shape of the bill. Referring to its habits, the Doctor says: "A very common resident in the pine belt, breeding plentifully. I have found it as high as the spruce forests, but never in them. It is essentially a bird of the pines, only occasionally descending to the cottonwoods of the low valleys. The oaks which are scattered through the lower pine zone supply a large share of its food. Its habit of industriously hoarding food in bark of pines and in all sorts of chinks and hollows is well known. These stores are the source of unending quarrels between this Woodpecker and its numerous pilfering enemies, and I have laid its supplies under contribution myself, when short of provisions and lost from the command with which I had been traveling, by filling my saddle-bags with half-dried acorns from under the loose bark of a dead pine."[1]

In Mexico it is reported that they store acorns in the dry flower stalks of the yuccas and the maguay, *Agave americana*, which is generally known as the "mescal plant" in Arizona.

In the Rogue River Valley, in southwestern Oregon, I found these birds exceedingly abundant in the canyons and foothills along the western slopes of the Cascade Mountains, and here one could see evidences of their industry every little while. I have seen the thick bark of large sugar and other pines, as well as partly decayed oak limbs and telegraph poles, completely riddled with small holes. Some trees certainly contained thousands of holes. A section of a partly decayed oak limb now before me, which is 3 feet 2 inches long and $5\frac{1}{2}$ inches in diameter, of which only about three-fifths of the surface has been utilized (the remainder having probably been found too solid) contains 255 holes by actual count. These holes are circular, and average about three-quarters of an inch in depth by half an inch in diameter; each one is intended to hold a single acorn, and they are generally placed from half an inch to an inch apart. The acorns fit these holes pretty accurately, and are apparently always driven in point foremost, the base of the acorn being flush with the surrounding wood and not readily extracted. It seems improbable and almost impossible, for a single pair of these birds to be able to excavate all the holes found in certain favorite trees, and I believe that stores so put away are shared in common by a number of birds living in the vicinity. There is considerable difference in the edible qualities of acorns; some are exceedingly palatable, while others are rather bitter. The Californian Woodpeckers know this, and as far as I have been able to detect only select the sweet ones. The supposition that they store only wormy ones, and allow the inhabitant to get fat before eating it, is nonsense; the meat

[1] The Auk, Vol. VII, 1890, pp. 249–254.

of the acorn is the attraction, not the worm in it, and there is no doubt that it furnishes their principal food during the winter, and more or less during the remainder of the year as well. To get at their contents, they are carried to a convenient tree where a limb has been broken off; the acorn is then driven firmly into some suitable crack between the splinters, or in a crevice in the bark (any place which holds it firmly answering the purpose) it is soon split open, the outer hull removed, and the kernel is then ready to be eaten.

Mr. F. Stephens writes me: "The Californian Woodpecker is an abundant winter resident in the oak forest, on the mountain slopes in southern California, and a rather common summer resident in mixed oak and pine forests; less common, though still not rare, in summer, in the oaks below the pines. It is always active and noisy, and more or less gregarious. At one of my camps in the pine region of Smith's Mountain a family of this species developed the sap-sucking habit. I had noticed some fresh holes in the bark of two live oaks, a foot or two from the ground, from which sap was flowing, and later I saw the birds drinking; in one case three were seen drinking at the same time. This is the only instance of the habit in this species that has come under my observation."

I found the Californian Woodpecker very abundant on the western slopes of the Cascade Mountains, on the wagon road from Fort Klamath to Jacksonville, Oregon, in the middle of June, 1883. Shortly after crossing the summit, and as soon as the first oak trees were met with along the western slope of the mountains, some of these birds were continually in sight, and their loud "tchurr, tchurr" could be heard in all directions. Several nests with young were found, and these made a buzzing sort of noise when disturbed; a single set of four slightly incubated eggs, one of them a runt, was taken on June 15, 1883, probably a second laying, the first set having been destroyed, as nearly all the birds had good-sized young at that time. The nests were all situated in live-oak trees, from 15 to 25 feet from the ground. The site, from which I obtained the set of eggs, was excavated on the under side of one of the main branches of a good-sized oak, about 22 feet from the ground, some eight feet away from the main trunk, and rather difficult to get at. I never saw Woodpeckers so abundant anywhere as this species was here. Evidences of their indefatigable industry were frequently visible. A telegraph pole was observed which was fairly honeycombed with small holes, and a large black pine had the bark perforated from near the base of the tree fully 40 feet up and all around the trunk. This tree alone must have contained several thousand holes. The only locality where I have observed this species on the eastern slopes of the Cascade Mountains was near Pelican Bay, on the west side of Klamath Lake, where a few straggling oaks existed, the only ones I have seen on that side of the mountains; this accounted for the presence of this Woodpecker there. It was quite rare, however, only three birds being noticed. I am erroneously quoted in "Nests and Eggs of American Birds," by Oliver Davie (3d edition, 1889, p. 220), as having found this species breeding near Camp Harney,

Oregon; I never met with this bird in southeastern Oregon, and know that it does not occur there.

Mr. J. K. Lord, the naturalist of the British Boundary Commission, on May 25, 1860, observed this species on the head waters of the Deschutes River, Oregon, also on the eastern slopes of the Cascades, among a mixed growth of pines and oaks. The latter are found here only in a few localities, and are not generally distributed through this region. He does not claim to have met this species in Washington, and is misquoted in "History of North American Birds" (Vol. II, 1874, p. 568).

Viewed from an economic standpoint, the Californian Woodpecker deserves protection, as it is unquestionably more beneficial than otherwise. The small amount of fruit it steals during a season is fully paid for by the insects and their larvæ it destroys at the same time.

In the more southern portions of its range nidification commences sometimes as early as April, and somewhat later farther north. The nesting sites are mostly excavated in white-oak trees, both living and dead, but preferably one of the former is selected in which the core of the tree is decayed. It also nests occasionally in sycamores, cottonwoods, and large willow trees, and more rarely in telegraph poles. Both sexes assist in the excavation of the nesting site, as well as in incubation. The entrance hole is about $1\frac{3}{4}$ inches in diameter, perfectly circular, and is sometimes chiseled through 2 or 3 inches of solid wood before the softer and decayed core is reached. The inner cavity is gradually enlarged as it descends, and varies from 8 to 24 inches in depth, usually being from 4 to 5 inches in diameter at the bottom, where a quantity of the fine chips are allowed to remain, on which the eggs are deposited. In the Rogue River Valley the nesting season is at its height about the latter part of May, and full sets of fresh eggs may be looked for here about the 20th of that month. I have seen the parents here carrying food in their bills to the young, and I believe they are mostly fed in this way. The number of eggs laid to a set is usually four or five, rarely more. Mr. F. H. Fowler, Fort Bowie, Arizona, writes me that he has taken a set of ten, saying, however, "evidently the product of. two females."

Like the eggs of all Woodpeckers, they are pure white in color; the shell is fine grained and not nearly as glossy as in the eggs of the preceding species. They are mostly short ovate in shape, a few only being elongate ovate.

The average measurement of nineteen specimens in the United States National Museum collection is 25.40 by 19.05 millimetres, or 1.00 by 0.75 inch. The largest egg measures 26.42 by 19.81 millimetres, or 1.04 by 0.78 inches; the smallest, 24.38 by 18.29 millimetres, or 0.96 by 0.72 inch; and a runt egg, 19.05 by 13.21 millimetres, or 0.75 by 0.52 inch.

The type specimen, No. 19414 (not figured), Bendire collection, from a set of four eggs, was taken by the writer near Ashland, Oregon, on June 15, 1883.

## 41. Melanerpes formicivorus angustifrons Baird.

NARROW-FRONTED WOODPECKER.

*Melanerpes formicivorus* var. *angustifrons* Baird, Ornithology of California, I, 1870, 405.
(B —, C 310*a*, R 377*a*, C 455, U 407*a*.)

Geographical range: Southern portions of Lower California.

The Narrow-fronted Woodpecker, a slightly smaller race with a brighter sulphur-yellow throat and a narrower frontal band than the Californian Woodpecker, is confined to the more southern portions of the peninsula of Lower California. It was described by the late Prof. Spencer F. Baird, in the "Ornithology of California, 1870" (p. 405), from specimens obtained by Mr. J. Xantus, in the vicinity of Cape St. Lucas, Lower California. Since then Mr. L. Belding found it common at Miraflores, and still more abundant in the Victoria Mountains. Mr. M. Abbott Frazar, while collecting for Mr. William Brewster, in 1887, in the Sierra de la Laguna, Lower California, found a nest of this subspecies on June 3, containing four eggs, which are now in Mr. Brewster's collection. He describes these as white, with a rather dull gloss, varying in shape from blunt ovate to broad elliptical oval, measuring, respectively, 0.95 by 0.75, 0.94 by 0.74, 0.89 by 0.77, and 0.89 by 0.76 inch; or 24.13 by 19.05, 23.88 by 18.80, 22.61 by 19.56, and 22.61 by 19.30 millimetres. Mr. Frazar tells me that, as nearly as he remembers, the nesting site was in a dead pine stump at no very great distance from the ground. Its general habits, food, etc., appear to be very similar to those of the Californian Woodpecker. There are no eggs of this subspecies in the United States National Museum collection.

## 42. Melanerpes torquatus (Wilson).

LEWIS'S WOODPECKER.

*Picus torquatus* Wilson, American Ornithology, III, 1811, 31, Pl. XX, Fig. 3.
*Melanerpes torquatus* Bonaparte, Geographical and Comparative List, 1838, 40.
(B 96, C 311, R 376, C 456, U 408.)

Geographical range: Western North America; from western Texas, New Mexico, and Arizona through Colorado, Wyoming, western South Dakota, Montana, and intervening regions west to the Pacific coast; north to southern British Columbia on both sides of the Cascade Mountains, and to southern Alberta, in the Dominion of Canada. Casual in western Kansas.

Lewis's Woodpecker, a handsome and rather peculiarly colored species, whose rich dark crimson and bristle-like breast feathers identify it at once, is of common occurrence in suitable localities throughout the West, ranging from the eastern slopes and foothills of the Rocky Mountains and adjacent ranges westward to the Pacific coast. In the more northern parts of its range it is only a summer visitor, and from about latitude 38° south it is an irregular resident,

retiring to the lower foothills and valleys to winter. It is especially abundant along the eastern slopes of the Sierra Nevadas, in California and Nevada, as well as on those of the Cascades in Oregon and Washington, and on both sides of the Blue Mountains and connecting ranges in Oregon, Washington, and Idaho. In the immediate vicinity of the coast it is not so common and occurs only sparingly, but a few appear to winter here.

Mr. R. H. Lawrence writes me: "I occasionally saw one in January, 1892, at Vancouver, and later in the season several apparently nested in the vicinity of Ridgeville, Clarke County, Washington, in the broken tops of large cottonwoods or willows, on the border of a slough of the Columbia called 'Lake River.' In the summer these birds came to feed in some cherry trees by the farmhouse where I stopped. Upon flying away each one usually carried off a cherry in its bill. The only call or note of this bird I have heard is a kind of peeping twitter, a sound that is weak and feeble for a bird of this size to give. On July 10, 1892, I saw one on a cherry tree in the garden, circling for insects; each time it flew a robin chased it, almost touching it, as valiant as a Crow after a Hawk, but the bird made no resistance to the several attacks. I also observed this species, on September 27, 1893, near Wilson's Peak, in southern California, at an altitude of about 5,200 feet, flying by with an acorn in its bill."

Mr. F. Stephens writes me: "*Melanerpes torquatus* is irregular in appearance in southern California, but is at times abundant. I have seen this species under circumstances that warrant the belief that it occasionally breeds here, but such instances are rare."

It probably breeds in small numbers in the pine forests of the higher mountain ranges in Arizona and southern New Mexico, where it has been found at all seasons of the year by different observers. I saw large flocks near my camp on Rillito Creek, during the winter of 1872–73, on several occasions; they are more or less gregarious at this season. In northern New Mexico and in Colorado it is a common summer resident up to 7,000 feet; these remarks apply also to similar regions in Wyoming and Montana. The eastern limit of its breeding range extends to the Black Hills, in South Dakota, where Mr. W. T. Wood took a specimen on August 2, 1856, which is now in the United States National Museum collection. In winter it has been met with in western Texas, and it straggles also occasionally into the western parts of Kansas. Although I have not been able to find a single reliable record of this bird having been taken in any of the northern States of the Mexican Republic, I am confident it will yet be found there as a winter visitor. I have met with Lewis's Woodpecker in the vicinity of nearly all the Military Posts I have been stationed at in the West, but found it nowhere so abundant as along the southern slopes of the Blue Mountains, in the vicinity of Camp Harney, Oregon, during the years 1875 to 1878. Here it was only a summer resident, usually arriving about the 20th of April, and in some seasons from seven to ten days later. It is by far the most silent Woodpecker I have met, and, aside from a low twittering, it

rarely utters a loud note. Even when suddenly alarmed, and when it seeks safety in flight, the shrill "huit, huit" given on such occasions by nearly all of our Woodpeckers is seldom uttered by it. Only when moving about in flocks, on their first arrival in the spring and during the mating season, which follows shortly afterwards, does it indulge in a few rattling call notes, resembling those of the Red-shafted Flicker, and it drums more or less, in a lazy sort of way, on the dead top of a tall pine, or a suitable limb of a cottonwood or willow. Its flight is not nearly as swift as that of the majority of our Woodpeckers, and reminds one more of that of Clarke's Nutcracker and some of our Jays, being accompanied by a considerable amount of flapping of the wings; it is also less undulating and more direct. In summer its food consists mainly of insects of different kinds, such as grasshoppers, large black crickets, ants, beetles, flies, larvæ of different kinds, as well as of berries, like wild strawberries and raspberries, service berries and salmon berries, acorns, pine seeds, and juniper berries, while in cultivated districts cherries and other small fruits enter into its daily bill of fare. Here, when common, it may occasionally do some little damage in the orchards, but this is fully compensated by the noxious insects it destroys at the same time. In localities where grasshoppers are abundant they live on these pests almost exclusively while they last. Mr. Shelly W. Denton tells me he noticed this Woodpecker gathering numbers of May flies (*Ephemera*) and sticking them in crevices of pines, generally in trees in which it nested, evidently putting them away for future use, as they lasted but a few days. It is an expert flycatcher, and has an extremely keen vision, sallying forth frequently after some small insect when this is perhaps fully 100 feet from its perch. Solitary trees, such as have a few dead limbs near their tops and afford a good outlook over the surrounding country, are much liked by them, and such a one is almost certain to be tenanted by a pair of these birds, if there are any to be found in the vicinity. I have rarely seen Lewis's Woodpecker in deep forests; far more frequently just on the outskirts of the pines, in juniper groves on the table-lands bordering the pines, as well as in the deciduous timber along streams in the lowlands, and occasionally even in solitary cottonwoods or willows, near some little spring, in the drier sagebrush-covered flats, miles away from the nearest forest; it is by no means as particular in the choice of a nesting site as the majority of our Woodpeckers. Shortly after arriving on their breeding grounds a suitable site is selected for the nest, and not infrequently the same excavation is used for successive years. In most cases the nesting sites are excavated either in the tops of tall pines or in dry cottonwoods, and in tall rotten tree trunks, occasionally in partly decayed limbs of sycamores, oaks, and less frequently in junipers and willows. The nests, as a rule, are not easily gotten at, and quite a number are practically inaccessible, varying in height from 6 to fully 100 feet from the ground. Dr. C. T. Cooke informs me that in the vicinity of Salem, Oregon, it usually nests in oaks, and is a rare breeder there. Lieut. H. C. Benson, United States Army, has sent to the National Museum a set of five eggs, taken near Gilroy, California, on May 8, 1894.

Mr. W. G. Smith took several sets of eggs near Loveland, Colorado, during the first ten days in June, and I have found it breeding near Fort Lapwai, Idaho, at Walla Walla, Washington; and at Fort Klamath and Camp Harney, Oregon. At the latter place these birds nested mostly in junipers, and their eggs were comparatively easily obtained. I have taken fresh eggs, a set of eight, here on May 17, and another of seven as late as June 29, showing the nesting season to be somewhat variable. The junipers which are selected for nesting sites were invariably decayed inside, and after the birds had chiseled through the live wood, which was usually only from 1 to 2 inches thick, the remainder of the work was comparatively easy; the same site, if not disturbed, was occupied for several seasons, and in such the inner cavity was much deeper, some being fully 30 inches deep and generally about 4 inches wide at the bottom. The entrance hole varies from 2 to 2½ inches in diameter, and when this is made by the birds it is always perfectly circular; but occasionally a pair will take advantage of an old knot hole, if it and the cavity it leads to are not too large. The presence of fresh chips found at the bottom of the tree enabled me to readily tell if the site was a newly made one, or one of the previous year, and a rap against the trunk easily told if it was occupied. On its breeding grounds Lewis's Woodpecker appears to be a stupid and rather sluggish bird; it does not show nearly as much parental affection as most of the other members of this family, and it is much less demonstrative. It is not at all shy at such times, and will often cling to some convenient limb on the same tree while its eggs are being taken, without making the least complaint. A second and smaller set is generally laid a couple of weeks later, if the first one is taken, and not infrequently in the same nest, if the entrance hole has been left intact. Both sexes assist in incubation, and this lasts about two weeks. The young leave the nest about three weeks after they are hatched, and are readily tamed. I kept a couple for several days, but they had such enormous appetites that I was glad to give them their liberty, as they kept me busy providing suitable food. They were especially fond of grasshoppers, but also ate raw meat, and climbed everywhere over the rough walls of my house. A considerable share of the food of these birds is picked up off the ground, and they appear to be much more at home there than Woodpeckers generally are. The young are fed on insects, and I believe also on berries; I have seen one of these birds alight in a wild strawberry patch, pick up something, evidently a strawberry, fly to a tree close by in which the nest was situated, and give it to one of the young which was clinging to the side of the tree close to the nesting site.

From five to nine eggs are laid to a set; those of six or seven are the most common, but sets of eight are not very rare; I found several of that number, and a single set of nine.

The eggs of Lewis's Woodpecker vary greatly in shape and also in size. They are mostly ovate or short ovate in shape, but an occasional set is decidedly rounded ovate, while others are elliptical ovate; the shell is close grained and, in

most cases, dull, opaque white, without any gloss whatever. Some sets, however, are moderately glossy, but scarcely as much so as the better-known eggs of the Red-headed Woodpecker, and none are as lustrous as the eggs of the Flicker.

The average measurement of one hundred and seventy-one specimens in the United States National Museum collection is 26.23 by 20.26 millimetres, or about 1.03 by 0.80 inches. The largest egg of the series measures 29.97 by 22.35 millimetres, or 1.18 by 0.88 inches; the smallest, 23.88 by 16.51 millimetres, or 0.94 by 0.65 inch; and a runt egg, 18.80 by 15.24 millimetres, or 0.74 by 0.60 inch.

The type specimen, No. 19363 (not figured), Bendire collection, from a set of nine eggs, was taken by the writer near Camp Harney, Oregon, on May 24, 1877; incubation had commenced in seven of these eggs and two were fresh; the male was caught in the nest.

## 43. Melanerpes carolinus (Linnæus).

RED-BELLIED WOODPECKER.

*Picus carolinus* Linnæus, Systema Naturæ, ed. 10, I, 1758, 113.
*Melanerpes carolinus* Ridgway, Annals Lyceum Natural History, New York, X, Jan., 1874, 378.

(B 91, C 306, R 372, C 450, U 409.)

Geographical range: Eastern United States; from Florida and the Gulf coast, north to southern New York, Pennsylvania, Ohio, southern Michigan, southern Wisconsin, southeastern South Dakota, and southern Ontario, in the Dominion of Canada; west to Nebraska, Kansas, the Indian Territory, and through about the eastern half of Texas. Rare or casual in eastern New York, Connecticut, and eastern Massachusetts.

The northern limits of the breeding range of the Red-bellied Woodpecker, also known as the "Carolina" and "Checkered" Woodpecker, "Zebra Bird," "Woodchuck," and in Florida as "Orange Sapsucker" and "Sham-shack," are not well defined as yet. It is questionable if it breeds in New York, although specimens have been taken in different localities in this State both in fall and winter. It is known to breed regularly in southwestern Pennsylvania, in Washington and Westmoreland counties, where it is a resident, and in a number of instances Red-bellied Woodpeckers have been taken much farther north in this State, mainly in winter. From southwestern Pennsylvania westward it becomes both more common and a more regular summer resident throughout its range as already indicated. In Nebraska it appears to be rare north of the Platte River, and it is also reported as a rare summer visitor in southeastern South Dakota by Dr. G. S. Agersborg, where he says it probably breeds. Strange to say, it has not been reported yet from any place in Minnesota; but it will undoubtedly be found in some of the southern counties in this State. Although the western limits of the range of this species are generally given as reaching the eastern slopes of the Rocky Mountains, I can not find any positive and reliable records of its occurrence west of the States of Nebraska and Kansas, and in these it seems to be rare in the western parts. It is fairly common and breeds

in the Indian Territory and the eastern part of Texas. It is a constant resident south of about latitude 39°, and not a few winter even at the northern limits of its range. It is a common and well-known resident in suitable localities throughout all the Southern and Middle States within its habitat. I presume, like the Red-headed Woodpecker, they are more or less irregular in their movements at this season, depending mainly on an abundant winter food supply. This handsome Woodpecker is not at all uncommon here in the adjoining counties of Maryland and Virginia, and is also met with in the District of Columbia. Here it is a resident, and prefers the more heavily timbered bottom lands and swampy woods to the hilly and drier forests. Throughout the northern portions of its range it prefers deciduous or mixed forests to coniferous, but in the south it is apparently as common in the flat, low pine woods as in the oak hammocks. Newly cleared lands in which numbers of girdled trees still remain standing are favorite resorts for this as well as other species. The Red-bellied, like the majority of our Woodpeckers, is a rather noisy bird. Its ordinary call note resembles the "tchurr, tchurr" of the Red-headed very closely; another sounds more like "chawh, chawh," and this is occasionally varied with a disagreeable creaking note, while during the mating season peculiar, low, mournful cooing sounds are sometimes uttered, which somewhat resemble those of the Mourning Dove. Its food consists of about equal proportions of animal and vegetable matter, and it feeds considerably on the ground. Insects, like beetles, ants, grasshoppers, different species of flies, and larvæ are eaten by them, as well as acorns, beechnuts, pine seeds, juniper berries, wild grapes, blackberries, strawberries, pokeberries, palmetto and sour-gum berries, cherries, and apples. In the South it has acquired a liking for the sweet juice of oranges and feeds to some extent on them; but as it always returns to the same one, until this ceases to yield any more juice, the damage done in this is but slight. It has also been observed drinking the sweet sap from the troughs in sugar camps. The injury it commits by the little fruit it eats during the season is fully attoned for by the numerous insects and their larvæ which it destroys at the same time, and I therefore consider this handsome Woodpecker fully worthy of protection. It is generally a rather shy and retiring bird throughout the greater part of its range; but in a few localities it is quite the reverse, and, according to Prof. D. E. Lantz, has been known to excavate its nesting sites in the cornices of buildings in Manhattan, Kansas. Here, as well as in some other of our prairie States, it nests also in telegraph poles.

Birds that migrate from the northern portions of their range usually arrive on their breeding grounds rather early, sometimes by March 20, and shortly afterwards preparations for nesting are commenced. A suitable site is readily found in the decayed top of some tree, or in an old stump, near a stream along the edges of a pasture, or close to some road, and less often farther in the center of a forest. Deciduous trees, especially the softer wooded ones, such as elms, basswood, maple, chestnut, poplar, willow, and sycamore, are preferred to the harder kinds, such as ash, hickory, oak, etc. In northern Florida they nest fre-

quently in pines. Several excavations are often found in the same tree in which the nest is located, and occasionally the same site, with slight repairs, is used for more than one season. Mr. E. A. McIlhenny tells me that this species is quite common near Alton, Illinois, where he saw an enormous cottonwood tree, standing near the banks of Wood River, occupied by several pairs of these birds, the tree being fairly riddled with their holes.

Mr. D. B. Burrows, of Lacon, Marshall County, Illinois, has kindly sent me the following notes on this species, as observed by him:

"The Red-bellied Woodpecker is a fairly common species in this section, and is found in the river bottoms, in the bluffs, or in the small timber tracts bordering the prairies. I also met with this species frequently in southern Arkansas, and found it to be the most common Woodpecker in north central Texas, and there it frequently makes its nest in telegraph poles. During the nesting season I have found the birds to be quite noisy about the nest, and in several instances have discovered the site, while building, by the noisy call of the bird; a search would reveal the female clinging to the tree just beneath the opening. Sometimes I have observed her standing motionless for quite a while, as though resting from her labors. This bird is a good nest builder, and with its sharp bill is able to excavate cavities in living trees. I have never found a nest in a tree that was wholly dead. Sometimes the dead extremity of an upright branch of a living tree is used, and again I have found the nest in the trunk of a living tree; in two instances I have found second-growth, living black oaks used, the nest cavity being about halfway up, where the body of the tree was not more than 7 inches in diameter. The birds do not seem to be particular as to the kind of tree used, as I have found them in many different species. The nest ranges from 15 to 60 feet from the ground. When it is reached, the birds fly about uneasily, uttering their oft-repeated "cha-cha-cha," and I have had the female alight on the same branch that I was on and but a few feet distant.

"In this part of Illinois the nesting season begins in April. I have taken fresh eggs as early as May 2 and as late as June 6, and have found young in the nest as early as the latter part of April, so that in some instances eggs are deposited quite early. I have never found more than four eggs to the clutch in this locality. In central Texas I took the first full set of five eggs on April 23, and believe they do not begin to nest much earlier in their southern range than they do here. The eggs taken from this locality average much larger than my Texas specimens, and five eggs to the clutch are not uncommon farther south."

Both sexes assist in excavating the nesting site, as well as in incubation, which lasts about fourteen days. The sites selected are usually from 5 to 70 feet from the ground, and resemble those of our other Woodpeckers in every respect, averaging about 12 inches in depth. It takes from seven to ten days to excavate a nest, and frequently the birds rest for a week afterwards before beginning to lay; an egg is deposited daily, and from three to five are usually laid to a set, rarely more. Climate seems to affect the time of their nesting very

little, as they appear to lay quite as early in the northern parts of their range as in the more southern. Full sets of fresh eggs may be looked for the last week in April and during the first half of May. Generally only one brood is raised in a season. Both parents are devoted to their eggs and young, and will frequently allow themselves to be captured rather than forsake their treasures. The eggs are white, mostly ovate in shape; the shell is fine grained and rather dull looking, with little or no gloss, resembling in this respect the eggs of Lewis's Woodpecker more than those of the Red-headed species.

The average measurement of twenty-four specimens in the United States National Museum collection (the majority of these coming from Florida) is 25.15 by 18.54 millimetres, or 0.99 by 0.73 inch. The largest egg measures 26.67 by 19.30 millimetres, or 1.05 by 0.76 inches; the smallest, 23.11 by 16.76 millimetres, or 0.91 by 0.66 inch.

The type specimen, No. 24727 (not figured), Ralph collection, from a set of four eggs, was taken by Dr. William L. Ralph, near San Mateo, Florida, on May 18, 1885.

## 44. Melanerpes aurifrons (Wagler).

GOLDEN-FRONTED WOODPECKER.

*Picus aurifrons* Wagler, Isis, 1829, 512.
*Melanerpes aurifrons* Ridgway, Proceedings U. S. National Museum, VIII, 1885, 355.
(B 92, C 307, R 373, C 451, U 410.)

Geographical range: Eastern Mexico; south to the City of Mexico; west to Jalisco; north into the southern portions of central Texas to about latitude 35° 10′ (Young County). Apparently not found in western Texas west of longitude 101°.

The breeding range of the Golden or Yellow-fronted Woodpecker is coextensive with its geographical distribution in the United States, and it is probably a constant resident wherever found. The northern limits of its range have been considerably extended during the past few years, the most northern point where it has been found, as far as known at present, being Belknap, Young County, Texas, where Mr. G. Ragsdale observed this species in the fall of 1878, and I would not be surprised to find it still farther extended into the extreme southwestern parts of the Indian Territory and Oklahoma. While it appears to be pretty generally distributed throughout southern Texas, it is less abundant in the central districts of the State, and throughout the more western parts it appears not to be found at all. In some of the eastern portions of its range in Texas it overlaps that of the preceding species, and its general habits are very similar to those of the former. It is equally at home in the more or less stunted mesquite, huisache (*Acacia farnesiana*), and post-oak thickets of the drier plains, as in the heavier and more luxuriant forests of the river bottoms.

Mr. D. B. Burrows has kindly furnished me with the following notes on the habits of this species, as observed by him near Roma, Starr County, Texas,

on the lower Rio Grande: "The Golden-fronted Woodpecker is a common resident species in this locality, and much more abundant than Bairds' Woodpecker, the only other variety that I have found here. They may be found wherever there is a growth of trees sufficiently large to afford nesting places, but are most numerous in the river bottoms where there is a heavy growth of old mesquite timber. During the fall and winter they may be found traveling about from place to place in pairs, and are easily located by the call note, which somewhat resembles that of the Red-bellied Woodpecker, the habits of the two birds being in many respects quite similar. In the spring, when nesting, they become very noisy, and when approached, utter their alarm note with great vigor. I have never known this species to drum on a dead limb, as most of the other Woodpeckers do. When searching for food they may be seen very diligently at work near the base of old trees, among the thick bushes, or even on the ground. The nest is by preference made in the live trunks of large trees, usually the mesquite, but sometimes in a dead stump or limb, the same cavity being used year after year, and it is quite a rare thing to see a fresh excavation. The nesting season begins in April, and most of the nests contain fresh eggs by May 10. I took a set of six eggs from a cavity in a live mesquite tree, the opening being but 2 feet 9 inches from the ground, but usually they are placed from 8 to 20 feet up. Although the birds are not notably shy, yet it is my experience that they leave the nest when approached, and it is a hard matter to find the bird in the excavation. If the nest is molested, the birds return and vigorously protest."

Mr. H. P. Attwater writes me: "The nearest point where these birds nest in the vicinity of Rockport, on the Gulf coast, is in the mesquite region, from 15 to 20 miles north of this place. Here their favorite nesting sites are in telegraph poles, and there are few that are without Woodpecker holes, as they appear to make new ones every year. Near San Antonio, Texas, where the Golden-fronted Woodpecker is a common resident, it nests in all kinds of tall live timber, pecan, oak, and large mesquite trees being preferred, but telegraph poles furnished favorite sites here also. A line running out of San Antonio to a ranch nine miles distant was almost destroyed by these birds; they came from all sides, from far and near, and made fresh holes every year, sometimes as many as five or six in a single pole. Here it also nests occasionally in artificial nesting sites, like bird boxes, etc., in yards and gardens."

I have read the following statement in a newspaper, said to have been made by a prominent official of one of the transcontinental telegraph lines, of which I quote only a portion:

"Woodpeckers are attracted to telegraph poles by the humming noise of the wires, caused by the latter's vibration in the wind, they believing that the noise is made by insects boring in the poles, and these birds accordingly lost much time and energy in knocking against the poles with their bills in order to drive the supposed insects to the surface, where the latter would be readily captured if they were only there to come out."

I do not believe for an instant that these birds are quite as readily deceived as this. The real cause of their predilection for telegraph poles, in my opinion, is this: These poles are in many instances taller than the prevailing timber found in the vicinity, and afford a much better outlook over the surrounding country. All Woodpeckers are fond of clinging to the highest dry limbs they can find in the vicinity of their nesting sites; hence their preference for telegraph poles in prairie country or in mesquite and post-oak scrub, which rarely attain any great height in the dry plains and hills where they are usually found. In such sections the telegraph poles furnish not alone a better outlook, but also convenient and secure nesting sites, and they are not slow to avail themselves of such advantages.

Their food consists of insects of various kinds, such as beetles, ants, grasshoppers, also larvæ, acorns, Indian corn, and different kinds of wild berries and fruit. Considered from an economic point of view, this Woodpecker certainly does more good than harm, and the only thing that can be said against it is that in certain localities where it is common it may make itself more or less of a nuisance by injuring telegraph poles.

Nidification commences sometimes in the latter part of March, but usually not much before the middle of April; both sexes assist in this labor, and it takes from six to ten days to excavate a proper nesting site; both live and dead trees are used for this purpose, as well as telegraph poles and fence posts; the holes are rarely over 12 inches deep, and are situated at no great distances from the ground, mostly from 6 to 25 feet up. From four to seven eggs are laid to a set, usually five or six; these are pure white; the shell is close grained, dull looking, with little or no gloss, and varying in shape from ovate to short and rounded ovate.

Incubation lasts about fourteen days, and both sexes share this duty. The earliest breeding record I have is April 7, 1884, on which date the late Capt. B. F. Goss took a set of five eggs, near Corpus Christi, Texas, which is now in the United States National Museum collection. It is probable that two broods are occasionally raised in a season, as there are sets of eggs in the collection taken in June, and two of these in the latter part of this month.

The average measurement of seventy-three eggs in the United States National Museum collection is 25.85 by 19.50 millimetres, or about 1.02 by 0.77 inches. The largest egg of the series measures 27.94 by 19.56 millimetres, or 1.10 by 0.77 inches; the smallest, 22.86 by 17.78 millimetres, or 0.90 by 0.70 inch.

The type specimen, No. 20902 (not figured), from a set of four eggs, was taken by Dr. James C. Merrill, United States Army, near Fort Brown, Texas, on April 28, 1877.

## 45. Melanerpes uropygialis (Baird).

GILA WOODPECKER.

*Centurus uropygialis* Baird, Proceedings Academy Natural Sciences, Philadelphia, June, 1854, 120.

*Melanerpes uropygialis* Ridgway, Proceedings U. S. National Museum, VIII, 1885, 355. (B 93, C 308, R 374, C 452, U 411.)

Geographical range: Southeastern California, southern Arizona, southwestern New Mexico, Lower California; south to Jalisco and Aguas Calientes, Mexico.

The Gila Woodpecker is a common resident in suitable localities throughout the greater part of southern Arizona, and is most common at altitudes of about 2,500, but it is met with here up to 4,500 feet. Although it has been reported as having been taken in several localities in New Mexico, for instance, by Lieutenant Whipple on Bill William's Fork, on February 16, 1854, this is really in western Arizona; a couple of more recent records, from Pueblo Viego, New Mexico, September 19 and 27, 1873, by Dr. C. G. Newberry, I believe will also have to be changed to Arizona, but I have been unable to find this place on any of the later maps. The only locality in New Mexico where the Gila Woodpecker seems to occur is in the Guadalupe Mountains, in the extreme southwestern corner of the Territory, where Dr. Edgar A. Mearns, United States Army, found it common along the international boundary line in the summer of 1893, and forwarded several specimens obtained in that vicinity to the United States National Museum. It reaches the northern limits of its range in the United States in the vicinity of Fort Mohave, Arizona, about latitude 35°, while in southeastern Arizona I believe it has not been detected as yet north of the Gila River, in about latitude 33°. It seems also to be found throughout the greater part of Lower California, where both Messrs. J. Xantus and L. Belding report it as common in the vicinity of Cape St. Lucas. Mr. Walter E. Bryant observed a few on Santa Margarita Island, and met with it generally along the overland route, and Mr. A. W. Anthony writes me: "I found the Gila Woodpecker not uncommon from the southern slopes of the San Pedro Martir Mountains nearly or quite to the coast of San Fernando, Lower California. Its presence was governed entirely by the giant cactus, and it was only in the near vicinity of the large growths of these that they were to be found." In a subsequent communication he states: "At the time I left my camp in the dry desert region, about 50 miles south of San Quentin, Lower California, on June 25, 1894, young of *Dryobates scalaris lucasanus*, *Melanerpes uropygialis*, and *Colaptes chrysoides* were all common in families. The cacti found here were vastly larger than in southern Arizona."

Relating to its distribution in southeastern California, Mr. F. Stephens sends me the following notes: "The western limit of this Woodpecker seems to be the Colorado River. I expected to find it in the central part of the Colorado Desert, where such species as *Dryobates scalaris bairdi*, *Pipilo aberti*, and *Harporhynchus crissalis* occur, but so far I have failed. I found a set of three partly incubated

eggs in a freshly excavated hole in a growing willow on May 4, 1886, opposite Yuma, on the California side of the Colorado River."

I first met with the Gila Woodpecker during the winter of 1871–72 in the vicinity of my camp on the Santa Cruz River, a few miles south of Tucson, and subsequently found it to be a common breeder at my permanent camp on Rillito Creek, some seven miles from Tucson. Its general habits resemble those of the Californian Woodpecker in many respects. Like it, it is a rather noisy bird; its ordinary call note, sounding like "dchürr, dchürr," can be heard in all directions in the spring; when flying from one point to another it usually utters a sharp, shrill "huit" two or three times, resembling the common call note of the Phainopepla, and which may readily be mistaken for it. It is also more or less addicted to drumming on the dead tops of cottonwood, sycamore, and mesquite trees. Its flight, like that of most Woodpeckers, is undulating, rather swift, and, on the whole, I consider it a more or less suspicious and shy bird. In southern Arizona at least, it seems to be equally partial to the well-timbered bottom lands and mountain canyons as well as to the giant cactus groves in the more arid foothill regions.

Its food consists of insects of various kinds, such as ants, beetles, grasshoppers, and larvæ, and in season largely on the sweet, fig-like fruit of the sahuaras, the giant cactus, and also, to a considerable extent, on the viscous berries of a species of mistletoe which is commonly found on most of the larger cottonwoods, oaks, and mesquite trees in these regions. These sticky, whitish-looking berries are a favorite food of many Arizona birds. While the majority of the Gila Woodpeckers in southern Arizona nest probably in sahuaras, quite a number breed also in the larger cottonwoods, sycamores, and mesquite trees, generally, however, either in inaccessible situations in dead limbs which can not be trusted, or in the live mesquite trees, in which the entrance can only be enlarged with a great deal of labor. I know no native tree whose wood is harder than this.

According to my observations, nidification in southern Arizona begins about the latter part of April, and full sets of fresh eggs may be looked for during the last two weeks in May. I found my first set of four eggs on Rillito Creek, on May 23, 1872. The nesting site was excavated in a limb of a large cottonwood tree, on the under side, and about 20 feet from the ground. The cavity was 18 inches deep and 4 inches wide at the bottom; the entrance hole was perfectly circular and only 2 inches in diameter. The limb was partly dead, and the nesting site was located in this, a few chips being left in the bottom of the hole, on which the eggs were deposited. Both birds were on hand and very uneasy while I was rifling the nest, uttering notes of protest from a limb overhead. As soon as I descended the tree they examined their despoiled home in turn, and were evidently much surprised to find their eggs gone. On May 28, 1872, I found a second nest, also containing four eggs, in a sahuara, about 20 feet from the ground. It caused me fully two hours of hard work, with two men assisting me, to get these, by planting a pole alongside and about

a foot from the cactus, and climbing up this. Incubation was about one-fourth advanced; the female was at home, but flew out as soon as the cactus was struck with a stick. The inner cavity was only 4½ inches deep and quite roomy; the juices of the cactus formed a hard incrustation, and the eggs laid on the bare, hard floor. On May 30 I took another nest, also in a cactus, containing four much-incubated eggs. This time I tried chopping, and had ropes thrown around the top of the cactus to steady it and let it come down slowly, but this plan did not work well, and two of the eggs were broken.

Fully three-fourths of these birds nest in cacti here, while the remainder, nesting in trees, are about equally difficult to get at. Most of their nesting sites are used for several years in succession; in fact, I doubt very much if a freshly excavated hole in a giant cactus is fit to nest in the same season. Both sexes assist in excavating the nesting site, and incubation lasts about two weeks.

The number of eggs to a set varies from three to five, sets of four being most common. Like those of all Woodpeckers, they are pure white in color. The shell is fine grained and not very glossy—not nearly as much so as the eggs of the Red-headed Woodpecker; they resemble more the eggs of the other species of this genus in this respect, and in shape they vary from ovate to elliptical ovate.

The average measurement of twelve eggs in the United States National Museum collection is 24.38 by 18.09 millimetres, or about 0.96 by 0.71 inch. The largest egg measures 27.43 by 18.80 millimetres, or 1.08 by 0.74 inches; the smallest, 22.86 by 17.27 millimetres, or 0.90 by 0.68 inch.

The type specimen, No. 19418 (not figured), Bendire collection, from a set of four eggs, was taken by the writer on Rillito Creek, near Tucson, Arizona, on May 23, 1872.

## 46. Colaptes auratus (Linnæus).

FLICKER.

*Cuculus auratus* Linnæus, Systema Naturæ, ed. 10, I, 1758, 112.
*Colaptes auratus* Vigors, Zoological Journal, III, 1827, 444.
(B 97, C 312, R 378, C 457, U 412.)

Geographical range: Eastern North America; from Florida and the Gulf coast north through the maritime provinces of Canada to Newfoundland and southern Labrador, and the shores of Hudson Bay, to about latitude 58°; thence in a northwesterly direction to Alaska, to about latitude 68°; west through about the eastern half of Texas, the greater part of the Indian Territory, Kansas, the eastern half of Nebraska, South and North Dakota, and the provinces of Assiniboia and Saskatchewan, Dominion of Canada, to northern British Columbia. Casual in California; accidental in Greenland and Europe.

The breeding range of the Flicker, also commonly known as "Golden-winged Woodpecker," "Yellow-shafted Flicker," "Yellow-hammer," and less often as "High-hole" or "High-holder," "Clape," "Wake-up," besides a number

of other more or less local names, is nearly coextensive with its geographical distribution. In the more northern portions of its range it is a regular migrant, while it is usually a resident south of latitude 38°, and winters in considerable numbers farther north, stragglers remaining even in Maine and New Brunswick. In the Southern States it is much more abundant in winter than in summer; still a number of these birds breed in southern Florida, while it appears to be a rather rare breeder in the immediate vicinity of the Gulf coast, in Louisiana and eastern Texas. It is a very common bird in suitable localities throughout the eastern United States and the more southern parts of the Dominion of Canada, being generally found below altitudes of 4,000 feet, and few species are more generally and better known than the Flicker. Its breeding range also is more extensive than that of any other member of this family found on the North American continent, ranging from about latitude 28° in Florida to Fort Anderson, British North America, in latitude 68° 35′ N., and probably still farther north. Here Mr. R. MacFarlane reports it as "by no means scarce in the valley of the Anderson; but, as its eggs were not in demand, very few indeed were gathered for transmission to Washington, D. C."[1]

It probably breeds throughout Alaska; both Messrs. J. Lockhart and Robert Kennicott forwarded skins and eggs from Fort Yukon, which are now in the United States National Museum collection, and it has been taken within a few miles of the coast in Bering Strait. One of the most western breeding records known to me is that furnished by Mr. R. MacFarlane, from Fort St. James, Stewart's Lake, British Columbia, who found the Flicker not uncommon there, both skins and eggs, taken in the summer of 1890, having been forwarded by him to the United States National Museum. In Labrador it is rare, and I doubt if it breeds there to any extent, excepting perhaps in the extreme southern portions. Along the western borders of its range in the United States it intergrades with *Colaptes cafer*, and quite an extensive transition zone exists here, including western Texas, the eastern slopes of the Rocky Mountains, and adjacent ranges, in which typical specimens of both species are found, as well as many intermediates which show the chief characteristics of one or the other species more or less distinctly. The same conditions exist to a somewhat less degree on the Pacific Coast, in California, Oregon, Washington, and British Columbia, where *Colaptes auratus* from Alaska intergrades with *Colaptes cafer* from the interior, and probably also with the darker northwest coast form, known as *Colaptes cafer saturatior*. For more detailed information on this subject I refer the reader to Dr. J. A. Allen's interesting paper.[2]

The Flicker is one of the most sociable of our Woodpeckers, and is apparently always on good terms with its neighbors. Birds which migrate usually return to their summer homes early in April, and occasionally even in March, and one will not have far to go then without hearing some of its

[1] Proceedings U. S. National Museum, 1891, vol. 14, p. 438.

[2] The North American Species of the Genus Colaptes, considered with special reference to the relationships of *Colaptes auratus* and *Colaptes cafer*, published by the American Museum of Natural History, Bulletin, Vol. IV, 1892, pp. 21–44.

many and rather melodious calls. The males usually precede the females a few days, and as soon as the latter arrive one can hear their well-known voices in all directions. One of their commonest calls at this season of the year is a clear "whick-ah, whick-ah;" another sounds like "quit-u, quit-u," a number of times repeated; "tchuck-up, tchuck-up," is another familiar sound uttered by them; a far-reaching "clape, clape" is also frequently uttered, while a quickly given rolling or rattling "thee-he-he-he-he" and a low "cäck-cäck-cäck" seem to be the notes of endearment. Another call when courting its mate sounds like "ouit-ouit" and ends with a soft "puir, puir," or a cooing "yu-cah, yu-cah." Low, chuckling sounds are also frequently uttered during their love making; another common call note sounds like "zee-ah, zee-ah," and during the summer a clear "pi-ack, pi-ack," or "pioh," is also frequently heard; in fact, no other of our Woodpeckers utters such a variety of sounds.

The Flicker is especially demonstrative during the mating season, and is an ardent wooer. It is an exceedingly interesting and amusing sight to see a couple of males paying their addresses to a coy and coquettish female; the apparent shyness of the suitors as they sidle up to her and as quickly retreat again, the sly glances given as one peeps from behind a limb watching the other—playing bo-peep—seem very human, and I have seen few more amusing performances than the courtship of a pair of these birds. The defeated suitor takes his rejection quite philosophically, and retreats in a dignified manner, presumably to make another trial elsewhere. I have never yet seen a pair of males fight over a coveted female. Few birds deserve our good will more than the handsome Golden-winged Woodpecker, and it is well entitled to all of the consideration generally shown it. Looked at from an economic point of view, it is an exceedingly useful bird, destroying many noxious insects and their larvæ, a great many of which are gleaned from the ground, as it is far more terrestrial in its habits than any other member of this family. Its beak is frequently covered with soil from digging in pastures after grubs and earthworms, and also in ant-hills after these insects or their larvæ, of which it is especially fond; it also feeds on hairless caterpillars. Different kinds of berries and fruit, such as cherries, apples, persimmons, strawberries, mulberries, raspberries, wild grapes, dogwood, whortle, poke, and sour-gum berries, and occasionally green corn, are also eaten by it. The damage it does to cultivated fruits is very trifling, and this bird deserves the fullest protection.

In the northern portions of its range nidification begins about a couple of weeks after the birds arrive from the South, and a suitable place is then selected for a nesting site. It prefers open country, interspersed here and there with groves and orchards, to the deeper forests to nest in. It is easily pleased in this respect—any old stump, a partly decayed limb of a tree, near the outskirts of a forest, along the banks of a creek, beside a country road, or in an old orchard, will answer the purpose. A fresh cavity is usually excavated every year, but where suitable trees or stumps are not readily available the same may be occupied for several seasons in succession. In the vicinity of Washington, District of

Columbia, these birds nest in the oak, ash, chestnut, elm, maple, poplar, willow and sycamore; spruce and birches are also used, but, on the whole, soft-wood trees seem to be preferred to hard ones. In the Southern States it breeds frequently in pines, and in the prairie States it occasionally selects strange nesting sites. Here it has been known to chisel through the weather-boarding of dwelling houses, barns, and other outbuildings, and to nest in the hollow space between this and the crossbeams; its nests have also been found in gateposts where both people and stock pass constantly, in church towers, and in burrows of Kingfishers and Bank Swallows in the perpendicular banks of streams. Dr. G. S. Agersborg, of Vermillion, South Dakota, records finding a nest of a Flicker in an old wagon hub, about 2 feet from the ground, and hidden by a rank growth of weeds; but the most peculiar nesting site I have ever heard of is one described to me by Mr. William A. Bryant, of New Sharon, Iowa, under date of December 7, 1892. He writes: "On a small hill, a quarter of a mile distant from my home, stood a haystack which had been placed there two years previously. The owner, during the winter of 1889–'90, had cut the stack through the middle and hauled away one portion, leaving the other standing with the end smoothly trimmed. The following spring I noticed a pair of Yellow-shafted Flickers about the stack showing signs of wanting to make it a fixed habitation. One morning a few days later I was amused at the efforts of one of the pair. It was clinging to the perpendicular end of the stack and throwing out chipped hay at a rate to defy competition. This work continued for nearly a week, and in that time the pair had excavated a cavity 20 inches in depth. The entrance was located 8½ feet above ground, and was 2½ inches in diameter and dug back into the stack for 6 inches, where it turned sharply downward and was slightly enlarged at the bottom. On May 28 I took a handsome set of seven eggs from the nest, the eggs lying on a bed of chipped hay. The birds lingered about the stack and by June 14 had deposited another set of eggs. They remained in the vicinity until autumn. During that winter the balance of the stack was removed. They returned the following spring, and, after a brief sojourn, departed for parts unknown. I never could quite understand the philosophy of their peculiar choice of this site, as woodland is abundant here. A well-timbered creek bottom was less than half a mile distant, while large orchards and groves surround the place on every hand."

Flickers nest occasionally in natural cavities and at distances from the ground varying from 2½ to 60 feet, but mostly between 10 and 20 feet. Old rotten stumps, and dead or partly decayed trees are preferred to live ones. The entrance hole is usually 2¼ inches in diameter, and the inner cavity varies from 8 to 30 inches in depth. It is gradually enlarged toward the bottom, and a layer of fine chips, on which the eggs are deposited, is allowed to remain. Its flight, although apparently laborious, is strong and swift, and, like that of all Woodpeckers, undulating or wave-like. It frequently perches on a limb instead of clinging to it, as do others of the tribe. In the spring of the year it also indulges in drumming, but not to the same extent as the majority of this family.

Mr. Manly Hardy, of Brewer, Maine, writes me: "I once found one asleep on the outside of a tree, late in the evening. I was traveling by moonlight, and knowing the exact location of the nest in a small poplar, decided to visit it. I walked close under the bird, without apparently waking him, and then struck the tree a blow with a club, which I felt sure would stun him, but he flew off all right. There was no bird inside of the hole, so he slept outside, clinging to the tree, from choice. This proves that they can and do sleep in this way. In blueberry time they congregate in flocks—I have seen at least thirty at once—and at such times their entrails are dyed blue from the fruit eaten. I have fed the young with strawberries when they were still in their nest, being obliged to put the first into their bills; but after that they ate them greedily, and would scratch up to the hole and look out when they heard me coming, acting just as if it was the old bird which was feeding them."

Nidification in the southern portions of its range begins ordinarily in the last half of March, and in the north from four to fully six weeks later. Both sexes assist in the construction of the nesting site as well as in incubation, and the male usually does his full share of work at both. According to Dr. William L. Ralph's observations in Florida, the male usually sits on the eggs during the night. In the South fresh sets of eggs may be looked for during the first week in April; in the vicinity of Washington, District of Columbia, during the first half of May, and in the more northern parts of its range, in Alaska and the Northwest Territory, about the first ten days in June.

Flickers breeding in Florida are generally somewhat darker colored and smaller than those from the more northern States, and this latter difference is especially noticeable in the eggs. From five to nine eggs are usually laid to a set, mostly six or seven; but considerably larger ones are sometimes found, possibly the product of two females laying in the same nest; but the fecundity of this Woodpecker is known to be very great. Prof. B. W. Evermann took not less than thirty-seven eggs from a pair of these birds (out of the same nest) between May 4 and June 22, 1885; and a still more remarkable instance is recorded in the "Young Oologist" (Vol. I, June, 1884, p. 26), by Mr. Charles L. Phillips, of Taunton, Massachusetts, who found two eggs of this bird in a cavity of a large willow on May 6, 1883, of which he took one, leaving the other as a nest egg; and he continued to do this day after day until the poor bird had laid seventy-one eggs in seventy-three days. Mr. Steward Ogilby, of Staten Island, New York, also reports, in "Forest and Stream" of June 25, 1885 (p. 427), finding a brood of not less than nineteen young Flickers in one nest, all alive and apparently in good condition. It seems almost impossible for a single bird to cover and hatch such a number of eggs, but the fact that the young were apparently well fed and in good condition is still more remarkable, and the parents must certainly have had a busy time to provide for such a large family.

The eggs of the Flicker are glossy white in color, and when fresh appear as if enameled; the shell is very close grained and exceedingly lustrous, as if polished, resembling the eggs of the Ivory-billed and Pileated Woodpeckers in

this respect. They are quite variable in shape; the majority are ovate, others short and elliptical ovate, and a few approach subpyriform, while some are nearly perfect ovals. An egg is deposited daily until the set is completed, and incubation lasts about fifteen days; this ordinarily does not begin until the set is completed, but now and then young birds and eggs in different stages of advancement are found in the same nest. The young are able to leave their nest in about sixteen days; they crawl about on the limbs of the tree for a couple of days before they venture to fly, and return to the nest at night. The parents are rather suspicious about the nesting site, and endeavor to keep out of sight as much as possible, even where not molested; they are devoted in the care of their young, and will frequently allow themselves to be captured on the nest. In the more northern portions of their range only a single brood is raised in a season; in the south possibly two. The return migration to their winter homes usually begins about the latter part of September, and is occasionally protracted from four to six weeks later in favorable localities.

The average measurement of one hundred and ninety-six eggs of this species in the United States National Museum collection, mostly from the more northern portions of its range, is 27.96 by 21.50 millimetres, or about 1.10 by 0.85 inches. The largest egg of the series measures 30.48 by 22.86 millimetres, or 1.20 by 0.90 inches; the smallest, 24.64 by 20.83 millimetres, or 0.97 by 0.82 inch. Three sets of eggs—two of five and one of six—taken in Putnam County, Florida, by Dr. William L. Ralph, average only 25.82 by 20.52 millimetres, or about 1.02 by 0.81 inches. The largest of these eggs measures 26.42 by 21.34 millimetres, or 1.04 by 0.84 inches; the smallest, 24.89 by 18.03 millimetres, or 0.98 by 0.71 inch, which is quite a perceptible difference in size.

The type specimen, No. 24612 (not figured), from a set of ten eggs, was taken on June 8, 1891, by Mr. R. MacFarlane, near Cumberland House, Saskatchewan, Dominion of Canada.

## 47. Colaptes cafer (Gmelin).

RED-SHAFTED FLICKER.

*Picus cafer* Gmelin, Systema Naturæ, I, 1788, 431.
*Colaptes cafer* Stejneger, Standard Natural History, IV, 1885, 428
(B 98, C 314, R 378*b*, C 459, U 413.)

Geographical range: Western North America; from the Isthmus of Tehuantepec, north over the table-lands of Mexico, through western Texas, New Mexico, Arizona, California, Oregon, the eastern portions of Washington, to southern British Columbia (east of the Cascade Mountains only) and southern Alberta; east, regularly to the eastern slopes of the Rocky Mountains, through Colorado, Wyoming, Montana, and western Assiniboia in the Dominion of Canada, and sporadically to Kansas, Nebraska, North and South Dakota; west, in Washington, only to the Cascade Mountains; south, in northern Lower California, in the San Pedro Martir Mountains, to about latitude 31°.

The Red-shafted Flicker, in which the under surface of the quills and tail feathers are deep orange vermilion, instead of yellow as in the preceding species, replaces the latter throughout the western United States and along the

southwestern border of the Dominion of Canada, east of the Cascade Mountains. It is a resident throughout the greater part of its range, excepting the more northern portions, wintering regularly in the vicinity of Fort Walla Walla, Washington, in latitude 46°, and it is pretty generally distributed, being as much at home in the higher mountain ranges up to altitudes of about 10,000 feet, as in the lower and much hotter valleys among the timbered bottom lands. As already stated, this species intergrades extensively with the preceding one along the eastern borders of its range, and typical specimens are not uncommonly met with in western Kansas, western Nebraska, and southwestern South Dakota; but as transition forms, or so-called "hybrids," predominate largely here, I do not include these sections in their range proper, considering them as neutral ground on which typical specimens of both species are about equally common.

Its breeding range is nearly coextensive with its geographical distribution. It appears to be an equally common summer resident on the Mexican table-lands as in the western United States. Here, however, it is not met with in summer in the lower Rio Grande Valley, nor throughout the dry and arid portions in the western parts of Texas and similar regions in southern New Mexico and Arizona, where it rarely breeds below altitudes of 6,000 feet. Mr. W. A. Anthony met with it in the San Pedro Martir Mountains, in Lower California, in summer, at altitudes of from 7,000 to 10,000 feet, evidently nesting; and near the coast, in winter, as low as 3,000 feet. I found this handsome bird a common summer resident nearly everywhere throughout the West, from eastern Montana west through Idaho, Oregon, Washington, and Nevada, to California, and an abundant winter resident in the vicinity of Tucson, southern Arizona, where it unquestionably breeds in the pine belt in the higher mountains.

In its general habits, food, call notes, etc., the Red-shafted Flicker resembles the preceding species very closely, and I have been unable to detect any notable differences. It is a trifle larger bird than the preceding, and in certain sections appears to be rather more partial to extensive forests than its eastern relative. Its nesting habits are also quite similar, and it adapts itself readily to the conditions found in its surroundings. Its favorite nesting sites are old rotten stubs or trees, such as cottonwoods, willows, sycamores, junipers, oaks, and pines. It nests also in holes in banks, in the sides of houses, in gate posts, etc. In the more northern portions of its range the migrants usually return to their breeding grounds during the last week in March or the beginning of April. Nidification begins about the 1st of May, and full sets of fresh eggs may be looked for about the middle of that month. The earliest set found by me, one of eight eggs, was on May 4, 1871, near Fort Lapwai, Idaho; the latest, one of seven eggs, on June 6, 1875, near Camp Harney, Oregon. In southern California they nest mostly in April, and here, Mr. F. Stephens writes me, "the Red-shafted Flicker is a common resident; I find it from sea level to the upper limits of timber, anywhere where trees occur. It often feeds on ants and insects picked from the ground." One brood only is usually raised in a season; but I believe an occasional pair of early nesting birds raises two. Among some peculiar nesting sites of this species the following deserve mention:

Mr. Walter E. Bryant gives the following: "One of these was in a bridge bulkhead, a few feet above the Carson River, Nevada. The interior of the structure was filled with gravel and large stones, among which the eggs were deposited. Another pair used a target butt, at a much-frequented range, as a substitute for a stump. A third nest was in a sand bank, 3 feet from the top and 10 from the creek. This hole was apparently specially prepared, and not one made by a ground squirrel, such holes being sometimes used by these birds."[1]

Mr. Charles A. Allen, of Nicasio, California, found a pair of Red-shafted Flickers nesting in a similar situation in a creek bank, the burrow containing seven eggs, which he took. About ten days later, happening to pass the same spot, he examined the hole again and found it occupied by a California Screech Owl, which in the meantime had deposited four eggs. Some two weeks subsequently he examined it for a third time, and on this occasion the tenant proved to be a Sparrow Hawk, which was setting on five handsome eggs. There was no nesting material present on any occasion, the eggs lying on some loose dirt.

Near Fort Lapwai, Idaho, on June 2, 1871, I found a pair of Long-eared Owls and Red-shafted Flickers nesting in an old cottonwood stump; the Owls occupied a natural cavity, and the Flickers had excavated their nesting site directly over that of the former, the entrance holes, although on different sides of the stub, were not over 2 feet apart. The Red-shafted Flicker's eggs, seven in number, were on the point of hatching, while those of the Owls were about half incubated. These birds evidently lived on good terms with each other. Occasionally, after incubation has commenced, additional eggs are laid at different intervals by this species. On June 6, 1875, near Camp Harney, Oregon, I found a pair of these birds nesting in a rotten pine stump, on the southern slopes of the Blue Mountains, the entrance hole being 3 feet from the ground. This nest contained three young birds, apparently just hatched, and two eggs already chipped, besides five perfectly fresh ones, one of these being a runt egg. In this vicinity the Red-shafted Flicker was very common, and nested mostly in junipers, usually from 3 to 12 feet from the ground; but I have also seen them entering holes in the dead tops of large pines, fully 70 feet above the ground. Besides the usual insects and larvæ upon which this species feeds, I have seen it catch grasshoppers, both on the ground and on the wing, and it is likewise very fond of wild strawberries and service berries. Considered from an economic point of view, the Red-shafted Flicker is as beneficial as the preceding species, and, like it, deserves the fullest protection.

The number of eggs in a set varies from five to ten, sets of six or seven being most common. These are indistinguishable from those of the preceding species, excepting that they average a trifle larger, and the same description will answer for both.

The average measurement of one hundred and fifty-two eggs in the United States National Museum collection is 28.34 by 21.68 millimetres, or about 1.12 by 0.85 inches. The largest egg of the series measures 32.76 by 22.35 milli-

[1] Bulletin California Academy of Sciences, II, August 2, 1887, pp. 451, 452.

metres, or 1.29 by 0.88 inches; the smallest, 25.15 by 20.57 millimetres, or 0.99 by 0.81 inch; and a runt, 20.57 by 15.75 millimetres, or 0.81 by 0.62 inch.

The type specimen, No. 19391 (not figured), from a set of ten eggs, was taken by the writer near Fort Walla Walla, Washington, on May 11, 1882.

## 48. Colaptes cafer saturatior Ridgway.

NORTHWESTERN FLICKER.

*Colaptes mexicanus saturatior* Ridgway, Proceedings Biological Society of Washington, II, April 10, 1884, 90.
*Colaptes cafer saturatior* Ridgway, MS.

(B —, C —, R —, C —, U 413*a*.)

Geographical range: Northwestern coast regions, from northern California north to southern Alaska (Sitka).

The breeding range of the Northwestern Flicker, a somewhat darker-colored race than *Colaptes cafer*, is confined to the coast districts of Washington, British Columbia, and the southern parts of Alaska north to Sitka, where it occurs both in the uplands and lowlands. In the corresponding regions in western Oregon, and probably also in northwestern California, it appears to be found only on the summits of the different mountains between the Cascades and the coast during the breeding season, where the same moist climate prevails as is found in the immediate vicinity of the coast, while in the drier lowlands, such as the Umpqua, Rogue, and Willamette river valleys, it is replaced by *Colaptes cafer* and by intermediates between the two forms. A specimen in the collection of the United States Department of Agriculture, taken near Glendale, in Douglas County, Oregon, on June 13, 1894, although not quite typical, seems to bear out this view; another from near Sodaville, Linn County, in the United States National Museum collection, taken in September, however, is a perfectly typical *Colaptes cafer saturatior*. As this subspecies is known to be a common winter resident in British Columbia, it is questionable if the latter was a migrant. I first met with this dark-colored race in the Puget Sound region, Washington, in the latter part of May, 1894, and found it moderately common in the vicinity of Seattle, in partly cleared tracts where there was a good deal of dead timber, and also in the rich bottom lands of the Puyallup River. Here, as the majority of its nesting sites are located in rotten trees, and frequently quite a distance from the ground, its eggs are rather hard to obtain.

Mr. John Fannin, curator of the Provincial Museum at Victoria, British Columbia, in his "List of Birds" found in that Province, reports this subspecies as follows: "Abundant west of the Cascades; a number winter in the neighborhood of Victoria."

According to Mr. E. W. Nelson, it does not appear to go regularly as far north as Sitka, Alaska. He says: "During Bischoff's visit to Sitka, at the time of the Russian-American telegraph expedition, numbers of these beautiful birds were taken there, and some of the specimens are now in the collection

of the National Museum. Since then, however, the bird has not been secured from that region. Both forms, *Colaptes auratus* and *Colaptes cafer saturatior*, undoubtedly breed in that section, their habitats overlapping, but no intermediate examples have been secured thus far."[1]

Its general habits, food, call notes, and nidification, as well as its eggs, are similar to those of the two preceding species, and the same description will answer for them. The only absolutely identified set in the United States National Museum collection is an incomplete one of four, taken by Mr. James Hepburn, near Victoria, British Columbia, in May, 1867. These measure, respectively, 30.94 by 21.84, 30.48 by 22.35 30.78 by 21.59, and 30.22 by 21.34 millimetres; or 1.22 by 0.86, 1.20 by 0.88, 1.21 by 0.85, and 1.19 by 0.84 inches.

The type specimen, No. 13205 (not figured), is the largest egg of this set.

## 49. Colaptes chrysoides (Malherbe).

GILDED FLICKER.

*Geopicus chrysoides* Malherbe, Review et Magasin Zoologique, IV, 1852, 553.
*Colaptes chrysoides* Reichenbach, Handbuch der speciellen Ornithologie, Scansoriæ, 1854, 413.

(B 99, C 313, R 379, C 458, U 414.)

Geographical range: Lower California and Sonora, Mexico; north, through southern and portions of northwestern Arizona, to latitude 35°. Casually to southeastern California.

The Gilded Flicker, also known as "Cactus" or "Cape" Flicker, which has the yellow shafts and quills of *C. auratus* and the red malar patch and ashy throat, as in *C. cafer*, is a common resident of the giant cactus belt of southern Arizona, the adjacent Mexican State of Sonora, and similar regions in Lower California. It was also met with on the Colorado River, near Fort Mohave, Arizona, by Dr. J. G. Cooper, in February, 1861, where these birds were feeding on larvæ and insects among the poplar trees, and were very shy and wary. It undoubtedly occurs also, occasionally at least, on the California side of the Colorado, but only as a straggler. It breeds throughout the rest of its range.

Mr. F. Stephens, who has collected quite extensively in southern Arizona, writes me: "So far as my experience goes, this Flicker is restricted to the giant cactus region. The most western point at which I have seen this species was near the head waters of Big Sandy Creek, in western Arizona, where the giant cactus is common. I have looked closely for this bird at Yuma, but failed to find it. All but one of the sets of eggs I have taken were found in holes in the giant cactus. The exception was a set taken near Tucson, Arizona, on April 25, 1884, from a dead cottonwood stub, and I shot the male in the mouth of the hole."

Mr. A. W. Anthony writes me: "The Gilded Flicker is rather common in the heavy growth of giant cactus, *Cereus pringlei*, but not adverse to the candle-

[1] Report upon Natural History Collections made in Alaska, No. 3, 1887, p. 161.

wood forests which cover a large part of the peninsula between latitudes 28° and 30°. Young were found by me in June at San Fernando and near San Carlos, Lower California."

Mr. J. Xantus found the Gilded Flicker very common in the vicinity of Cape St. Lucas, and quite a number of specimens now in the United States National Museum collection were taken by him there; these average a trifle smaller than the Arizona birds.

Mr. W. E. D. Scott met with this species in the early spring and fall on the San Pedro slope of the Catalina Mountains, in southern Arizona, as high up as 3,000 feet, and saw now and then single individuals in the mesquite timber, far away from any giant cactus.[1]

I first met with this Flicker in some large cottonwoods on Rillito Creek, near Tucson, in the spring of 1872, and also found a pair nesting in a dead limb of one of these trees, but the site was inaccessible. I at first considered these birds rare, and not until the nesting season was over did I discover how abundant they were in an extensive giant cactus grove in Sahuarita Pass, a few miles northeast of my camp. Here numbers of them were feeding on the sweet, fig-like fruit of this cactus, in company with other species, and, as many of the cacti had holes dug in their sides, this was unquestionably a favorite breeding place for them. I do not consider the Gilded Flicker a very shy bird in the late summer and fall, and I could have shot numbers of them at different times had I wanted to do so. I paid but little attention to this species when I first saw it, taking it at the time to be the common eastern Flicker, from the similarity of its appearance when flying, and only discovered my error on shooting one on June 16, 1872. Its call notes, manner of flight, and general habits are so similar to those of the common Flicker that one, particularly a novice, as I was then, might readily make such a mistake. Its food consists mainly of insects of different kinds and their larvæ, as well as of wild berries and fruits, and it obtains a good portion of this on the ground.

By far the greater number of these birds nest in the sahuaras or giant cactus; and where these are not found within reasonable distances, this species is not apt to be met with, at least not during the breeding season. This is at its height from the middle of April to the end of May, and, as Mr. F. Stephens has taken its eggs in June, it is possible that two broods are occasionally raised in a season. It nests at varying distances from the ground from 8 to 40 feet, generally at heights of about 15 feet. I have the indurated form of a nesting cavity of this species now before me, showing its exact shape. The hardened walls are about one-fourth of an inch thick, and show the inner contour of the cavity perfectly. The entrance is nearly 3 inches in diameter; inside it is about 7 by 4 inches wide and 5½ inches deep. The sides and bottom of the cavity are quite smooth, considering the nature of the substance (the soft inner pulp of the cactus) out of which it is excavated. It occupied only one-half of the trunk of one of these giant cacti, and the rear of the cavity did not quite reach

[1] The Auk, Vol. V, 1886, p. 429.

the center of the plant. The eggs lay on the hardened floor, and not, as usual, on a layer of chips. I am inclined to believe that a freshly excavated nesting site is not habitable for some weeks, as it must require some time for the exuding sap to harden. The mold before me somewhat resembles a wasp's nest, both in color and shape, and if suspended from the limb of a tree might easily be mistaken for one. From two to five eggs are laid to a set, usually four, and these are indistinguishable in shape and color from those of the rest of our Flickers.

The average measurement of seven eggs in the United States National Museum collection is 28.96 by 21.63 millimetres, or about 1.14 by 0.85 inches. The largest egg measures 30.78 by 22.10 millimetres, or 1.21 by 0.87 inches; the smallest, 26.92 by 20.32 millimetres, or 1.06 by 0.80 inches.

The type specimen, No. 22635 (not figured), from a set of four eggs, was taken by Mr. Herbert Brown, near Tucson, Arizona, on May 25, 1884, from a hole in a giant cactus, 15 feet from the ground.

## 50. Colaptes rufipileus Ridgway.

GUADALUPE FLICKER.

*Colaptes mexicanus rufipileus* Ridgway, Bulletin U. S. Geological and Geographical Survey of the Territories, II, No. 2, April 1, 1876, 191.

*Colaptes rufipileus* Ridgway, Bulletin Nuttall Ornithological Club, II, July, 1877, 60.

(B —, C —, R 380, C —, U 415.)

Geographical range: Guadalupe Island, Mexico.

The Guadalupe Flicker was discovered by Dr. Edward Palmer in 1875, while engaged in making natural history collections on Guadalupe Island, off the coast of Lower California, and nearly all of the land birds obtained by him at the time proved to be insular forms and new to science. Since then Mr. Walter E. Bryant has twice visited this remote island, which is situated about 250 miles to the south and west of San Diego, California, the northern extremity lying in about latitude 29° 10′ N. and longitude 118° 18′ W. It is about 15 miles in length, with a maximum width of 5 miles, and it is said to reach an altitude of about 4,500 feet at its highest point. There are some pines, cypress trees, and cabbage palms found on the island. For all the information we possess about the life history of this insular Flicker, whose habitat appears to be confined to this island, we are indebted to Mr. Bryant, who published an interesting paper entitled "Additions to the Ornithology of Guadalupe Island" (in Bulletin 6, California Academy of Sciences, January 5, 1887, pp. 269 to 318), from which I extract the following relating to this little-known species:

"Comparatively speaking, this bird was not rare in the restricted area of the large cypress grove, but apart from this locality less than a dozen were seen. Three specimens were taken among some palms, within a short distance from the beach, on the eastern side of the island. Only one was heard among the pines at the northern portion, and in the vicinity of the large palm grove on the northwestern slope they were occasionally seen.

"Of all the species of this family I have ever met with, none have been so tame and unsuspicious or less frightened by the report of a gun. In January I witnessed a peculiar habit not before noticed, I believe, in birds of this genus. A pair of Flickers were perched facing each other upon a gnarled root about 3 feet from the ground, their heads within a foot of each other. Suddenly the male, who had been sitting motionless before the female, began a somewhat grotesque performance, which consisted in a rapid bobbing of his head. In this he was immediately followed by the female. This spasmodic bobbing and bowing they repeated alternately a few times, when both stopped as suddenly as they had commenced. After an interval of a few seconds the male began again, and was joined by the female. The movement resembled more an upward jerk of the head than a bow.

"Approaching on my hands and knees to get a closer view, I could hear a low, chuckling sound while these strange actions were in progress. What the outcome of this love-making—for such I regarded it—would have been I did not ascertain. The fear of losing the specimens—almost the first I had seen—prompted me to fire. The first shot brought down the female. At the report away flew the male, followed by another male, which, unseen by me, had been quite near, on the ground. They returned while I was still holding the female, and thus gave me an opportunity of securing them both. Their evident lack of timidity permitted me to draw near enough to plainly distinguish the characteristic bright red cheek patches. In February I saw a repetition of the action above noted, the birds being in a cypress tree above me. They were very tame, especially the female, who came quite near as I lay upon the ground, whistling "quit-tu, quit-tu," and watching her puzzled actions. In a half-dead cypress this pair had partially pecked a cavity for a nest. In addition to the familiar scythe-whetting notes they have the peculiar "wake-up" call and its rapid prelude of monosyllables. By imitating this call I decoyed a distant female to within short range, the bird coming through the thickest of the cypress grove, stopping at short intervals to call and listen for a reply.

"The food of this species during a portion of the year consists largely of smooth-skinned caterpillars, besides numerous beetles and ants; the latter are always obtainable and, growing to a large size, figure as an important item of their diet. The scarcity of decayed trees, with the exception of fallen ones, necessitates either work upon seasoned wood or the resort to dead palm stumps. The nests will therefore be found at heights varying from 3 to 15 feet.

"By March 16 the birds were invariably found in pairs, and my wish to secure a setting of eggs before departing seemed in a fair way of being fulfilled. Strolling among the cypress, on the 27th of March, I found four trees upon which the birds were at work or had been recently, and in such cases the birds themselves were always to be found in the immediate vicinity. Passing a half-dead tree, I heard the sounding taps of a Woodpecker at work, and as I neared the spot the slight noise which I made as I carefully picked my way over the rock-strewn ground caused a handsome male bird to suddenly appear at an

opening about 4 feet high. With a foot grasping either side of the entrance he gazed upon the intruder. Having comprehended the situation, he flew to another tree, where he quietly awaited my inspection and departure. The hole was then down about 15 inches. By April 7 it had reached a depth of about 20 inches, and contained six fresh eggs, upon which the female was then sitting. As no description has hitherto appeared of the eggs of this species it may be well to present here the measurements of this set (No. 803, author's oölogical collection). They correspond exactly, both in color and general shape, with scores of other eggs of this genus, and offer the following measurements in millimetres: 28 by 22, 28 by 22, 28 by 22.5, 29 by 22, 29.5 by 22, 29.5 by 22;" or about 1.11 by 0.87, 1.11 by 0.87, 1.11 by 0.89, 1.14 by 0.87, 1.16 by 0.87, and 1.16 by 0.87 inches.

There are no eggs of this species in the United States National Museum collection.

## Family CAPRIMULGIDÆ. Goatsuckers, etc.

### 51. Antrostomus carolinensis (Gmelin).

CHUCK-WILL'S-WIDOW.

*Caprimulgus carolinensis* Gmelin, Systema Naturæ, I, ii, 1788, 1028.
*Antrostomus carolinensis* Gould, Icones Avium, 1838.
(B 111, C 264, R 353, C 396, U 416.)

Geographical range: From the South Atlantic and Gulf States and the Lower Mississippi Valley north to the southern portions of Virginia, Illinois, and Indiana, the greater portion of Arkansas, southern Missouri, and the Indian Territory; west to Texas; south in winter to the West India Islands, and through eastern Mexico and Central America to Colombia, South America. Casual in southern Kansas; accidental in Massachusetts.

The breeding range of Chuck-will's-widow, also locally known in South Carolina as the "Dutch Whip-poor-will" or "Chip-the-red-oak-white-oak," and in some of the West India Islands as the "Spanish Whip-poor-will," is coextensive with its geographical distribution in the United States, excepting the lower Rio Grande Valley, in Texas. It is only a summer visitor over the greater portion of its range with us, but, according to Mr. W. E. D. Scott, in "The Auk" (Vol. VI, 1889, p. 252), "Some of these birds are resident on the Gulf coast of Florida, at least as far north as Tarpon Springs, where in winter, in December and January, they are rather rarer than at other seasons of the year." Mr. E. A. McIlhenny also tells me that they are common residents in southern Louisiana. By far the greater number, however, retire farther south, wintering in the West India Islands, as well as in Central America, and a few even pass the Isthmus of Panama to Colombia, South America. They usually reenter the United States, from their winter homes in the south, early in April, and move leisurely northward to their breeding grounds, returning southward again about the beginning of September. The males usually make their appearance on the breeding grounds

a few days before the females. During their migrations they are said to travel singly, or at most in small companies, and not in large flocks, like most other species, and these journeys are performed entirely at night.

Chuck-will's-widow is the largest of the *Caprimulgidæ* found in the United States, and, like the rest of the members of this family, it is crepuscular and nocturnal in its habits, being rarely seen on the wing in the daytime, unless accidentally startled from its hiding place. It spends its days mostly hidden away in dark shady places in woods, among the undergrowth, especially along rocky hillsides, resting either on the ground or in some hollow log, under a ledge of rock, or perched lengthwise on some low limb of a bushy, densely-foliaged tree. Although a tolerably common bird throughout the more southern portions of its range, it is by no means as well known generally as it might be, and only a careful and patient observer can expect to become familiar with its general habits. Its flight is extremely noiseless, the very embodiment of grace and agility combined, and in this respect it resembles our Owls somewhat, now skimming along close to the ground, dropping down suddenly to pick up some beetle, then dashing upward again, perhaps after a moth; constantly twisting and turning from one course to another, but always on the lookout for any passing insect. As soon as the sun has disappeared behind the horizon, all the Chuck-will's-widows in the neighborhood become alert at once, leave their customary resting places in search of food, and, during the mating season especially, commence to utter the peculiar call, "chûck-will's-widow," from which they have derived their name. This strangely doleful-sounding note is occasionally, particularly while under sexual excitement, uttered very rapidly for two or three minutes or more, the syllables being all rolled into one, until the bird is compelled to take a rest from sheer want of breath. The late Dr. William C. Avery, of Greensboro, Alabama, well known as an excellent observer, wrote me as follows on this subject: "In general cadence the first three syllables are about equal, the syllable 'wid' being accented and emphasized, and the last syllable, 'ow' being only about half the quantity of the first three. Pronounce the syllables just as I have given them here, with the accent on 'wid' and the quantity of the preceding ones equal in length with the intoned syllable, and you have the call note of *Antrostomus carolinensis*.

"When frightened from its nest, or when flying late in the evening, it utters a harsh note at times, and this resembles, to my ear, the syllable 'baw! baw! baw!' These notes, apparently of displeasure or alarm, are low and can not be heard at a great distance, while, during a still night, the 'chuck-will's-widow,' or call note, rapidly repeated, may be heard for a mile or more. These notes, during the mating season at least, are uttered from dusk to about 9 p. m., and while singing they usually sit on the ground, on a log or rock, or occasionally on a fence rail, or on a low limb of a tree, and in such a position they usually sit lengthwise, not crosswise, on the limb. I have known this bird from early boyhood and am positive that it never chants its monotonous song while on the wing, as has been recently stated. It is also said 'that if either

their eggs or young are disturbed they are carried off in the capacious mouths of the birds to some distant part of the forest, in the same manner that a cat transports her kittens.' I must say that I do not believe this assertion. I purposely flushed the parent off the eggs which I sent you three times on May 3, 1890, when I first found the nest, and once on the 4th, altogether four times, before I took the set, and yet the old bird returned each time and continued to sit in the same place as long as her eggs remained there. When I flushed the parent from her nest on the 3d of May she had only one egg, though she was setting; on the 4th she still had but one, and it was only on the 5th, the third day after I found the nest, that she laid the last egg."

It is possible that this species removes its eggs to a different locality occasionally when disturbed, but this habit does not, by any means, appear to be universal; the young, however, are more frequently hidden in some other place by the parents under similar circumstances.

The food of Chuck-will's-widow consists mainly of beetles, winged ants, and other insects, especially the night-flying *Lepidoptera*—such as the *Spingidæ* (Hawk moths), *Saturnoidæ* (silk moths), and *Noctuidæ* (Owl moths)—and the enormous width of its short bill enables it to swallow the largest of these very readily. It does occasionally aspire to larger game, and it seems to be a well-established fact that small birds form a portion of its regular bill of fare.

A well-authenticated instance of its cannibalistic tendencies is published by Dr. F. W. Langdon among his field notes on Louisiana birds, in the "Journal of the Cincinnati Society of Natural History" (Vol. IV, 1881, p. 151), in which he makes the following statement: "The stomach of a female shot on April 14 contained the partially digested body, entire, of a Swamp Sparrow, intermingled with the feathers of which were numerous remains of insects, chiefly small beetles."

More recent observations, made by Mr. John I. Northrop on Andros Island, one of the Bahamas, between March 14 and July 3, 1890, fully confirms this. He published the following regarding this species: "Three specimens were taken, two of which were disturbed in the woods during the daytime and the other shot at dusk. Upon examining the stomach of the first one shot, I found, among an indistinguishable mass of brownish matter, a small bone, about half an inch long, that looked like the leg of a small bird. The next one examined contained in its stomach the partially digested remains of an entire Hummingbird, enough of which was preserved to identify it beyond a doubt as *Sporadinus ricordi*." [1]

Audubon, as well as Dr. John Gundlach, also mentions having found the remains of birds in the stomachs of this species, and it would appear that such a diet formed a not unusual part of its regular fare.

In the southern part of their range nidification begins sometimes by April 10, more often in the latter part of this month and during May, and occasionally eggs are found as late as June 30. I believe, as a rule, only one brood is raised

[1] The Auk, Vol. VIII, 1891, p. 73.

in a season; but this last record, which is from Titusville, Florida, seems to indicate that two broods may occasionally be raised under favorable circumstances. The most northern breeding record I have is one from the Washita River, in the Indian Territory, in about latitude 35°, but it undoubtedly breeds in suitable localities as far north as latitude 38°. Although fairly abundant throughout the greater part of Texas during the breeding season, it is not found anywhere in the lower Rio Grande Valley or vicinity, and I have no authentic records of its breeding there, where it appears to be entirely replaced by Merrill's Parauque, *Nyctidromus albicollis merrilli*. It appears to be quite common in Putnam County, Florida, and the majority of the eggs in the United States National Museum collection were obtained there by Dr. William L. Ralph, where it mostly nested in oak thickets, under trees whose branches nearly touched the ground, both in swampy and dry situations.

Chuck-will's-widow makes no nest; the eggs are usually laid on the dry leaves covering the ground, in deciduous forests, and occasionally on the bare ground, either in flat woods or on brush-covered and rocky hillsides—in fact, such nesting places seem to be preferred by this species to flat, level woods, when obtainable. The two eggs are deposited on alternate days, and incubation commences with the first egg laid. I believe the female performs the duties of incubation almost entirely, but both sexes are very devoted parents. The bird on the nest will try as assiduously to draw the intruder away from its young as the Ruffed Grouse, by feigning injury and fluttering along on the ground. It usually also emits a hissing noise when disturbed.

The eggs of Chuck-will's-widow are among the handsomest found in the United States; the shell is fine-grained, rather thin, and moderately glossy in most cases. They are usually elliptical oval in shape, or about equally rounded on both ends. The ground color of these eggs is of such a subtle tint that it is almost impossible to describe it accurately; it varies from a rich cream, with a faint pinkish suffusion, to a pale cream, and more rarely to a pure white. They are in most cases more or less profusely blotched, marbled, and spotted with different shades of brown, tawny, fawn, and Isabel-color, underlaid and mixed with lighter shades of ecru drab, lavender, pearl gray, and pale heliotrope purple. In an occasional specimen some of the markings take the shape of irregular lines and tracings, like those of the eggs of the Grackles; in others they are fine and minute, obscuring the ground color to some extent. In some specimens the darker shades predominate; in others, the lighter; in fact, there is an endless variation in the style of markings, but in the entire series there is not a single specimen which is not perceptibly marked. The eggs are rather large, considering the size of the bird.

The average measurement of forty-two specimens in the United States National Museum collection is 35.87 by 25.76 millimetres, or about 1.41 by 1.01 inches. The largest egg of the series measures 40.13 by 27 43 millimetres, or 1.58 by 1.08 inches; the smallest, 35.30 by 25.15 millimetres, or 1.39 by 0.99 inches.

The type specimen, No. 20444 (Pl. 1, Fig. 8), from a set of two eggs, Bendire collection, was taken in Comal County, Texas, on June 15, 1879, and represents a small but a very handsome egg. No. 24488 (Pl. 1, Fig. 9), also from a set of two eggs, from the Ralph collection, was taken by Dr. William L. Ralph, in Putnam County, Florida, on May 1, 1891, and represents one of the bolder-marked types, the specimen being somewhat above the average size.

## 52. Antrostomus vociferus (Wilson).

WHIP-POOR-WILL.

*Caprimulgus vociferus* Wilson, American Ornithology, V, 1812, 71, Pl. 41, Figs. 1–3.
*Antrostomus vociferus* Bonaparte, Geographical and Comparative List, 1838, 8.
(B 112, C 265, R 354, C 397, U 417.)

Geographical range: Eastern North America; north to the southern portions of the Dominion of Canada in the provinces of Nova Scotia, Quebec, and northern Ontario, to southwestern Keewatin and western Manitoba; west in the United States through eastern North and South Dakota, Nebraska, western Kansas, the Indian Territory, and Texas; south in winter through eastern Mexico to Guatemala. Casual to Porto Rico and the West Indies.

While the familiar call of the Whip-poor-will, from which it receives its name, is almost universally known to every farmer's boy throughout its range, the bird itself is not nearly so often correctly identified, and our common Nighthawk, or Bull-bat, is frequently mistaken for the author of these notes. It is only a summer visitor throughout the greater portion of the United States and the southern parts of the Dominion of Canada, usually arriving from its winter haunts in Guatemala and southern Mexico, along the southern portions of its breeding range in the United States, about the middle of March; and moving leisurely northward, it reaches our middle States about April 15, and the more northern ones from one to three weeks later. Not a few Whip-poor-wills winter regularly in the southern parts of Florida, as well as along the Gulf coast of Louisiana; these are probably birds which breed mainly north of the United States. As far as I have been able to ascertain, this species reaches the extreme northern limits of its range on the north shore of Lake Winnipeg, near Norway House, one of the Hudson Bay Company's Posts, situated in the southwestern part of the Province of Keewatin, in about latitude 54°. It is a common summer resident in suitable localities throughout Manitoba, and a set of eggs is now in the United States National Museum collection taken by Mr. William MacTavish, near Lake Manitoba, in June, 1862. The western limits of its range extend well into the Great Plains. Mr. A. W. Menke writes me that he has shot this species in Finney County, in southwestern Kansas, where it evidently breeds, but is rare; and it is undoubtedly also a summer resident throughout the greater part of Nebraska, as well as of North and South Dakota.

Mr. William Lloyd records it as a summer resident in the eastern portions of Concho County, and Mr. H. P. Attwater observed it in Bexar County, Texas.

These points furnish probably about the western limits of its breeding range in this State. It is apparently a very rare summer resident in Florida, and in the immediate vicinity of the south Atlantic and Gulf coasts in Alabama and Mississippi; it becomes somewhat more generally distributed throughout the hill country of western South Carolina, northern Georgia, and Alabama, but is still rare here. The late Dr. William C. Avery, one of the most reliable ornithologists of the South, met the Whip-poor-will near Anniston, Alabama, in July, and while rather rare, it unquestionably breeds there to a limited extent. Mr. W. J. Myers records it as sometimes breeding in Hillsboro County, Florida, where he found a nest and two eggs on April 5, 1893; and Mr. E. A. McIlhenny informs me that he found it nesting on Avery's Island, in southern Louisiana, where it was a rare summer resident, but far more common in fall and winter. He also says: "These birds are very tame, for on two occasions, while sitting still in the twilight to observe the movements of some Owls, I have had them come so close that I could have caught them. On one occasion one lit on my knee, and another on my foot as it was extended before me." The Florida and Louisiana breeding records are the most southern I know of, and it breeds more or less commonly in suitable localities throughout the remainder of its range. Like many other species, it is very much attached to its once chosen haunts, and will return to them from year to year, often nesting in the identical spot, or at most within a few feet of it, if the immediate surroundings have not been changed too much in the meantime. It returns south again during the first part of October. Its favorite resorts are dense, shady thickets, bordering on clearings and river valleys; rocky and brush-covered hillsides, and rolling country, interspersed alternately with woods and cultivated tracts, are preferred to the more level prairie regions. In the latter it is only found along the river bluffs, among the shrubbery, and rarely any distance away on the open and nearly treeless plains, unless at dusk and in early hours of the night, while in search of food on the roads leading through these. Its flight is strong, swift, graceful, and entirely noiseless, gliding like a shadow close along the ground in pursuit of night-prowling insects, mainly *Lepidoptera* and *Coleoptera*, on which it feeds almost exclusively. In the Western States, which are sometimes overrun by swarms of Rocky Mountain Locusts, it also feeds largely on these when abundant. Considered from an economic point of view, the Whip-poor-will is an eminently useful and beneficial bird, deserving the fullest protection. Like Chuck-will's-widow, it is crepuscular and nocturnal in its habits, and is rarely seen in the daytime unless accidentally driven from its hiding place. It passes the hours of daylight in shady retreats, either on the ground or on low limbs of trees (on which it always perches lengthwise) on old logs, and on or under rocks well covered by underbrush. It is rarely found at higher altitudes than 3,500 feet. The familiar call note of the Whip-poor-will is well expressed by its name, but it sounds to me more like "Whip-poor-wick," especially when uttered close to the listener. On their first arrival on the breeding grounds this call is especially frequently and rapidly repeated at the

beginning of dusk, and throughout the early part of the night, sometimes for minutes at a time, without any perceptible intermission, and one can then easily decoy these birds by imitating this call.

They are said to sing also occasionally during the day, but I never heard one at such a time, even during cloudy weather. As the breeding season advances they become more and more silent, but they sometimes sing as late as September, never with the vim and persistency, however, as on their first arrival, when frequently half a dozen or more of these birds may be heard at the same time, forming a perfect chorus, their notes blending so completely into each other that they sound like a continuous "whipper-whipper-whipper," the last syllable being entirely lost in the medley of noise produced; still such vocal concerts are not especially unpleasant to the ear, and rather lull the listener into a sound sleep.

About dusk the Whip-poor-will emerges from its hiding place in some neighboring thicket and goes hawking for its evening meal. A considerable portion of its food is picked up from the ground, especially on well-traveled roads, on which it frequently indulges in a dust bath to rid its body of vermin. It will visit some favorite spots regularly, and slightly sandy roads are preferred to heavier soil. Its movements on the ground are rather awkward, its feet being weak and short; but few of our birds are more graceful on the wing than the Whip-poor-will. I have seen one touch the back of its wings together as it swept by me, arrest its noiseless flight instantly, drop to the ground almost perpendicularly, pick up some insect, and dash away as suddenly as it halted. At such times it occasionally utters a low, purring or grunting noise like "däck-däck," and another sounding like "zue-see, zue-see," which can not be heard unless one is close by.

While on a collecting trip in Herkimer County, New York, with Dr. William L. Ralph, in June, 1893, I witnessed a most amusing performance, which one may see perhaps once in a lifetime. I happened to be in a little outbuilding, some 20 feet in the rear of the house at which we were stopping, early on the evening of the 24th, about half an hour after sundown, when I heard a peculiar, low, clucking noise outside, which was directly followed by the familiar call of "whip-poor-will." A pair of these birds paid us regular visits from the neighboring forest, often perching on the roof of the house, on the garden fence, on the limbs of a crab-apple tree near by, or occasionally alighting on the sandy road passing in front of the house, where they would allow themselves to be closely approached before taking wing, and treated us to a nightly concert. Directly alongside of the small outbuilding previously referred to, a barrel of sand and lime had been spilled, and from the numerous tracks of these birds, made by them nightly afterwards, it was evident that this spot was visited regularly, and was the trysting place of at least one pair. Looking through a small aperture, I saw one of the birds waddling about in a very excited manner over the sand-covered space, which was perhaps 2 by 3 feet square, and it was so much interested in its own performance that it did not notice me,

although I made some noise trying to fight off a swarm of musquitoes which assailed me from all sides. Its head appeared to be all mouth, and its notes were uttered so rapidly that, close as I was to the bird, they sounded like one long, continuous roll. A few seconds after his first effort (it was the male) he was joined by his mate, and she at once commenced to respond with a peculiar, low, buzzing or grunting note, like "gaw-gaw-gaw," undoubtedly a note of approval or endearment. This evidently cost her considerable effort; her head almost touched the ground while uttering it, her plumage was relaxed, and her whole body seemed to be in a violent tremble. The male in the meantime had sidled up to her and touched her bill with his, which made her move slightly to one side, but so slowly that he easily kept close alongside of her. These sidling movements were kept up for a minute or more each time; first one would move away, followed by the other, and then it was reversed; both were about equally bold and coy at the same time. Their entire love making looked exceedingly human, and the female acted as timid and bashful as many young maidens would when receiving the first declarations of their would-be lovers, while the lowering of her head might easily be interpreted as being done to hide her blushes. Just about the time I thought this courtship would reach its climax, a dog ran out of the house and caused both to take flight. He always showed an unaccountable antipathy for these birds, and invariably chased them as soon as one would alight near by. I watched for them on several subsequent evenings, in the same place, but they never returned there so early, but their fresh tracks on the sand showed that the place had been visited later in the night.

In the more southern portions of its range the Whip-poor-will nests usually about the first week in May, occasionally only during the last two weeks in April, and in the more northern parts usually not before June

Mr. H. W. Flint, of New Haven, Connecticut, has kindly furnished me with the following notes on this species: "This beautiful bird is a great favorite of mine, and I have devoted considerable time to studying its habits. It shows a strong attachment for certain localities to the neglect of others apparently equally suited to its tastes, and I have taken five sets of its eggs within 100 feet of a given point, and even when the first set was taken the female will often lay again within a rod or two of the original site. It nests rather early, May 20 to 25 being the average date of my finds. I know of no more ludicrous sight in bird life than that offered by the female when suddenly surprised with young. She flies or rather flops about the intruder in a circle, often alighting to tumble about upon the ground among the leaves, spreading the tail and opening the mouth, at the same time emitting a sound something like the cry or whine of a very young puppy, and also other guttural, uncouth sounds, wholly indescribable, the young themselves, in their scanty dress of dark yellow fuzz, apparently all mouth, adding to the general effect. I once, and once only, saw a female (the male is never present at the nest) carry a young bird about a rod, but can not say she used her bill, and don't think she did, but I am almost

sure the claws and legs only were used, as the young was hugged close to the body. I have never known the eggs to be removed, though I have left them in two or three different instances.

"I found a pair of young one morning and went home after my camera; but upon my return, several hours later, they were gone and the old bird also, and a careful search failed to disclose their retreat. In this case it would appear that the old bird removed them, as they were certainly too young to travel far themselves. The eggs that I have found (with the exception of one set) resemble each other closely, and were all taken in moderately open second-growth woodland and on ridges somewhat elevated above the immediate surroundings. No attempt at a nest has been observed; the eggs were placed in slight depressions and usually on one large leaf, never near a log or rock.

"The set referred to above as exceptional is quite heavily marked, and one egg has the spots on one side merged into one large blotch. It was taken July 4, 1884, at Deep River, Connecticut, and is the latest date on which I have found eggs, though I believe that two broods are reared."

The Whip-poor-will, like the other species of the *Caprimulgidæ* found in the United States, makes no nest, but deposits its eggs usually on a layer of dry leaves of deciduous trees, sometimes on dry pine needles, and occasionally on the bare ground, generally under thick bushes which afford plenty of shade, in some secluded and out-of-the-way corner, near the outskirts of forests, or on brush-covered hillsides, river bluffs, etc., which are not readily accessible and not disturbed much. It is naturally a timid and retiring bird, and does not brook repeated intrusion very gracefully. The nesting site selected is always a well-drained and a dry one; light and sandy soils are preferred to heavier ones, and it rarely, if ever, nests in places that are subject to overflow.

The number of eggs to a set is two; these are deposited on alternate days, and incubation commences with the first egg laid. I believe the female attends to this duty almost exclusively, and she is a most devoted parent, using all the well-known artifices of many ground-building species to entice the intruder away from the vicinity of her treasures. Occasionally she will remove her eggs if the nesting site has been disturbed, and the egg is said to be carried away in her capacious mouth; but this is not a regular habit by any means. The callow young, however, are more frequently carried to a safe locality if too often disturbed. The eggs of the Whip-poor-will are large for the size of the bird, and elliptical oval in shape; the shell is rather frail, close-grained, and somewhat variable in the amount of luster present; some are rather glossy, while others show little or no gloss.

The ground color of these eggs is usually pure white; occasionally a faint cream tint is perceptible, and the markings consist of blotches, spots, and tracings of different shades of brown, tawny and lighter tints of ecru drab lavender, lilac, and pearl gray. In most specimens the markings are profuse in some the darker, but in the majority the lighter tints predominate, and an occasional egg is almost unspotted. On the whole, they are not nearly as

handsome eggs as those of Chuck-will's-widow, and they are generally much lighter colored.

The average measurement of thirty-three specimens in the United States National Museum collection is 29.13 by 21.29 millimetres, or about 1.15 by 0.84 inches. The largest egg of the series measures 30.48 by 22.86 millimetres, or 1.20 by 0.90 inches; the smallest, 27.68 by 20.57 millimetres, or 1.09 by 0.81 inches.

The type specimen, No. 18256 (Pl. 1, Fig. 10), from a set of two, was taken by Mr. Robert Ridgway, near Wheatland, Indiana, in May, 1888, and represents one of the better-marked eggs of this species; No. 20450 (Pl. 1, Fig. 11), from the Bendire collection, also from a set of two, was taken on June 9, 1887, at Owings Mills, Baltimore County, Maryland, and shows one of the lighter-marked specimens.

## 53. Antrostomus vociferus macromystax (Wagler).

STEPHENS'S WHIP-POOR-WILL.

*Caprimulgus macromystax* Wagler, Ibis, 1831, 533.
*Caprimulgus vociferus macromystax* Hartert, Ibis, 1892, 286.
(B —, C —, R —, C 881, U 417*a*.)

Geographical range: From Guatemala, Central America, north over the Mexican table-lands to southwestern New Mexico and southern Arizona.

Stephens's Whip-poor-will, a somewhat larger subspecies than its eastern relative, was first described by Mr. William Brewster, in the "Bulletin of the Nuttall Ornithological Club" (Vol. VI, 1881, pp. 69–72), from a specimen obtained by Mr. F. Stephens, who first met with it in the Chiricahua Mountains, Arizona, on May 2, 1880. Subsequently he found it also in the Santa Rita Mountains, in 1881, where it was, however, less numerous than in the former range the year previous. In speaking of Stephens's Whip-poor-will, Mr. Brewster says, on page 71: "In the Chiricahua Mountains it is apparently not uncommon, to judge from the following notes which accompanied my specimen: 'I have heard several of these Whip-poor-wills singing at one time, and am told that they were heard here last year. I hear *P. nuttalli* every evening. They keep high up the mountain side, while this Whip-poor-will affects the lower part of the canyons.' * * *

"In a recent letter Mr. Stephens adds: 'I heard the first Whip-poor-will about the middle of May. By June 1 they were as common as I ever knew them to be in the East; sometimes I could hear three or four whistling at once; they were very restless and rather shy, so I got only the specimen I sent you, and a female shot in the daytime. The latter flew off her nest, which, as usual, was only a very slight depression in the ground, but in this case was overhung by a rock. The single egg (now before me) is plain white, with very faint brownish spots, so faint that one would hardly notice them. She would have laid no more; this was on July 4, 1880.'"

In the same bulletin (Vol. VII, 1882, p. 212) Mr. Brewster describes this egg as follows: "The egg is white, with a dull gloss. At first sight it appears to be immaculate, but a closer inspection reveals a few faint blotches of the palest possible purple, so faint, indeed, that they might pass for superficial stains were it not for the fact that they underlie the external polish The absence of well-defined markings may probably be explained by the assumption that the bird had laid one or more clutches earlier in the season, thus exhausting her supply of coloring pigment. The specimen measures 1.17 by 0.87 inches (or 29.72 by 22.10 millimetres)."

Mr. F. Stephens, in his notes on this subspecies sent to me, says: "The locality where I found the egg was a gulch near the summit of the Chiricahua Mountains, in a thick forest of yellow pine. The nest, if it can be called so, was a slight depression scratched in the ground, under the edge of a bowlder. Incubation was advanced. I do not agree with Mr. Brewster (to whom I presented the egg) in thinking that it was a second brood. My opinion is that this species is a late breeder, as it is also a late migrant."

Dr. A. K. Fisher met with Stephens's Whip-poor-will during the month of June, 1894, and has given me the following notes: "The Whip-poor-will's note was not heard at Fort Bowie, Arizona, during the last three weeks of May, 1894. When we made camp at the mouth of Rucker Canyon, some forty miles south of the Post, in the Chiricahua Mountains, on the last day of the month, we heard a few, and a couple of days later found the species abundant higher up in the same canyon, among the pines (*P. ponderosa*). Here at early dusk and at dawn their notes were heard almost continuously, and numbers of birds were seen. On June 5 Mr. Fred. Hall Fowler found a nest, if the slight depression in the ground can be so designated, on a steep side hill about 50 feet above the stream. It was situated under an overhanging bush at the edge of a flat rock, and contained two young, recently hatched, and the fragments of egg shells from which they had emerged.

"At Fly Park (altitude about 10,000 feet) the species was very much less common, though a few were heard every night. While feeding they often alight on a prominent rock or dead stub, from which they launch out after passing insects and return to wait for other prey."

Its call note, although resembling that of the common Whip-poor-will, is said to be harsher and louder. Lieut. H. C. Benson, Fourth Cavalry, United States Army, also met with it near Fort Huachuca, and shot a female there on May 18, 1887, which is now in the United States National Museum collection.

Mr. W. W. Price writes me: "I distinctly heard the note of Stephens's Whip-poor-will in the Graham Mountains, Arizona, at about 7,000 feet elevation, on July 19, 1894. I also have good reasons to believe the testimony of a Government packer, who says he has heard its cry in the White Mountains, north of Fort Apache, in about latitude 34°."

It appears to be pretty generally distributed throughout the higher mountain ranges of southern Arizona, and undoubtedly breeds wherever found; its

favorite resorts seem to be the rocky sides of canyons. The remnants of the eggshells found by Mr. Fowler (the lower half), which he kindly sent me for examination, are uniformly pale cream colored and apparently unspotted; and the egg of this species is evidently but slightly marked. He writes me: "The eggs were deposited on a bed of oak leaves by the side of a large rock; there was no nest excepting the bare leaves, which had been hollowed out slightly; both parents and the two young ones were taken and they are now in my collection; the latter were covered with light brown down, and were not more than 1½ inches long."

There are no eggs of Stephens's Whip-poor-will in the United States National Museum collection, and no specimens are figured.

## 54. Phalænoptilus nuttalli (Audubon).

POOR-WILL.

*Caprimulgus nuttalli* Audubon, Birds of America, VII, 1843, 350, Pl. 495.
*Phalænoptilus nuttalli* Ridgway, Proceedings U. S. National Museum, III, 1880, 5.
(B 113, C 266, R 355, C 398, U 418.)

Geographical range: Western United States, from the Sierra Nevada and the Cascade mountains eastward to southeastern South Dakota, eastern Nebraska, Kansas, the Indian Territory, and eastern Texas; north to eastern Washington, Idaho, Montana, and southern North Dakota; south in winter through eastern Mexico to Guatemala, Central America. Casual east to Iowa and Missouri.

The Poor-will or Nuttall's Poor-will, a somewhat smaller species than our eastern Whip-poor-will, is distributed over quite an extensive range, its habitat being mainly confined to the interior, from the eastern borders of the Plains and the Great Basin regions to the Sierra Nevada and Cascade mountains on the West. As far as yet known it does not appear to be found north of our border, but it will not surprise me to see it yet recorded from the southern portions of western Assiniboia and Alberta, in the Dominion of Canada, especially as it is known to occur in Montana, the type coming from the upper Missouri River, in that State. Its breeding range is coextensive with its distribution in the United States, where it is chiefly a summer resident; the majority of these birds migrate to the table-lands of eastern Mexico, and many go still farther south to Guatemala. A few, however, winter along our southern border, in the Colorado Desert in southeastern California, as well as in similar localities in southern Arizona, New Mexico, and southwestern Texas. I heard the unmistakable notes of this species early in December, 1872, in the vicinity of my camp on Rillito Creek, near Tucson, Arizona, and again about the middle of February, 1873.

In some of its habits it differs considerably from the preceding species of this family which are almost entirely confined to the denser woodlands; the Poor-will, however, although frequently found in similar localities, is apparently equally as much at home on the open prairie and the almost barren and arid regions of the interior, which are covered only here and there with stunted

patches of sage (*Artemisia*) and other desert plants. The climate does not seem to affect it much, as it inhabits some of the hottest regions of the continent, like Death Valley, in southeastern California, as well as the slopes of the Rocky and Blue mountains, in Oregon, where it reaches altitudes of from 6,000 to 8,000 feet. I have heard the Poor-will in Bear Valley, Oregon, in a locality where frost could be found every month in the year. In the eastern parts of its range it overlaps that of the Whip-poor-will for some distance, and it appears to be quite common in portions of eastern Kansas, notably so about Manhattan, where Prof. D. E. Lantz has repeatedly found it breeding. In a letter dated October 4, 1892, speaking of Nuttall's as well as of the more recently described Frosted Poor-will, he says: "The Frosted Poor-will is not uncommon in this locality. I have noticed more specimens at the time of their spring migration than later. Indeed, at that time it seems about as common as the other form, *Phalænoptilus nuttalli*. But in the breeding season nearly all the birds seem to be of the latter kind. However, my own observations lead me to regard the '*frosted*' as a mere color phrase of *Phalænoptilus nuttalli*. I have met with both birds together in migration, and once found a pair of fledglings near where they were hatched, one of the birds showing a decided hoary or frosted coloring on the wing and tail feathers, the other being without these markings Only the female parent was seen. She was a typical *Nuttalli*. The young birds were caught and handled. The frosted one was not so well developed as the other. So far as I have observed, there is no difference in the habits or in the eggs of the two birds.

"I have found a number of sets of the older variety, some of them before I knew that there was a frosted form; since then I have always been careful to positively identify the parents before taking the eggs. The birds can easily be secured by the use of a butterfly net, or even by dropping a hat over them as they sit in the sun; but the precaution to secure them is unnecessary to the practical eye, for one can always have leisure to study them before they take to flight. With one exception the eggs taken were laid upon bare patches of gravel or on low, flat rocks, and placed usually near a bunch of weeds or a tuft of grass. The exception was a set found on the bare ground in an alley in Manhattan City. This alley was in constant use and it was strange that the eggs remained for so long a time undisturbed, for when taken incubation had begun in both eggs. The Poor-wills usually keep to the vicinity of steep hills and old dead grass. They seem to return to the same locality from year to year to breed."

The food of the Poor-will consists mainly of the smaller night-flying moths, beetles, locusts, etc., of which a considerable portion are gathered from the ground. Its flight is swift, easy, and perfectly noiseless as it skims along close to the ground in search of suitable morsels, and of these the more indigestible parts, such as wing coverts of beetles, etc., are ejected in the form of pellets, in the same manner as in the Raptores and other birds. As far as I have been able to observe, it does not utter its well-known and mournful-sounding note of "puih-whee-ee" while on the wing, and the last syllable is uttered so low that

unless one is close to the bird it can not be readily detected. I have heard the unmistakable song of this species in many places in the West, but although fairly common over a great extent of country, it is much more frequently heard than seen. I have also spent considerable time in vainly looking for the eggs of this species, and only succeeded in obtaining a single set. Its lugubrious calls are most often heard shortly after dusk, along the sides of rocky canyons in the foothills, and less often on the level plains and the mountain summits; its call note is also occasionally uttered in the daytime, but not often.

Mr. Fred. W. Koch writes me on this subject as follows: "On the morning of May 5, 1891, in the vicinity of Matarango Spring, in the Coso Valley, California, while walking along a sheep trail on the hillside above the spring, I was surprised to hear a Poor-will call from the opposite hill several yards away. Thinking it singular for this bird to utter its note in the daytime, I stopped to hear it repeated and to make sure of its identity. Just then its mate flew up about 10 feet away, and on examination I found a single fresh egg laid on the ground in a little bare spot a few feet in diameter; next day there were two eggs, which were taken. The bird probably uttered the call to warn its mate." This set is now in the United States National Museum collection.

This species was fairly common near Camp Harney, Oregon, along the slopes of Rattlesnake Canyon, in which the Post was built. It usually arrived here about April 15, and any fine evening after sundown several of these birds would "tune up" and commence calling from different directions along the sides of the canyon, and keep up their concert for an hour or more. On the evening of May 20, 1877, while returning to my quarters, I noticed a pair of these birds hopping along the main road directly in front of the officers' quarters, evidently feeding, and subsequently I saw sometimes half a dozen, within a distance of 300 yards, similarly engaged. They were quite tame, and would scarcely move out of my way. I more than once approached within two feet of one before it took flight, and then it flew only a few feet before settling down again. A very low, grunting sound, like "pweek pweek," and another caused by the snapping together of the mandibles, were the only noises made while so engaged; they never uttered their ordinary call on this road. On June 4, 1877, a short distance above the Post, I flushed one of these birds on a small plateau, over which numerous bowlders were scattered; the scant patches of soil being covered with sage and other bushes. This bird fluttered and tumbled around me in a circle, which made me suspect that its nest was close by; but the most careful search failed to reveal it. I am positive a pair nested there, as I could hear their calls in about the same place every night. The Poor-will sits so close and its plumage harmonizes so perfectly with the ordinary surroundings that its eggs or young are only discovered by accident. The only set of eggs obtained by me was found on the dry, barren plains south of my camp on Rillito Creek, near Tucson, Arizona, on August 2, 1872; they were fresh and laid on the bare ground under a small grease-wood bush (*Obione*) and were fully exposed to the sun. The male was shot. From the late date on which these eggs were found I believe

this species raises two broods a year, at least throughout the southern portions of its range. It did not appear to be common on these plains, but in the foothills its calls were much more frequently heard.

The eggs of Nuttall's Poor-will were first discovered by Dr. G. Suckley, on July 17, 1859, on the North Fork of the Platte River, in western Nebraska, and an egg of this set is at present in the United States National Museum collection. I find that it had been correctly entered, but its existence had evidently been overlooked, as no mention of it is made in the "History of North American Birds, 1874," by Baird, Brewer, and Ridgway. There are also specimens from Nevada, California, Utah, Colorado, and Arizona in the collection. Like the balance of the species belonging to this family, Nuttall's Poor-will is crepuscular and nocturnal in its habits, and is rarely met with in the daytime unless accidentally flushed; but as it is very tame, and will scarcely move unless in danger of being stepped on, it is very seldom seen during the day which it spends in repose under some bunch of grass or a low bush, beside a rock or sometimes on one, and although it may often be sitting in plain view and within a few feet of one, it is not readily detected. I think it rarely perches on low limbs of trees. Although common enough in suitable localities throughout its range, genuine eggs of Nuttall's Poor-will are still rare in oölogical collections.

Nidification begins rather late; the earliest breeding record I have is May 5, from southeastern California; the majority mention the months of June and July, and a single one names the beginning of August. Two eggs are laid to a set on alternate days; I believe both sexes assist in incubation and in the care of the young, and both are devoted parents; they will let you almost touch them before they forsake their treasures. The eggs lay usually on the bare ground, close to some little bush, to shelter them somewhat from the rays of the sun. They vary from oval to blunt elliptical oval in shape; the shell is rather thin, close grained, and moderately glossy. Their color is usually stated to be white, but on close inspection it can readily be seen that it is a delicate cream, with a faint pinkish tint which does not perceptibly fade. Eggs in the collection taken more than twenty years ago still plainly show this peculiar tint. The eggs are unspotted as a rule, but an occasional specimen shows a few faint, darker shell markings around one end, which are barely perceptible to the naked eye, and which fade considerably in time.

The average measurement of thirteen specimens in the United States National Museum collection is 25.15 by 19.05 millimetres, or 0.99 by 0.75 inch. The largest egg measures 26.67 by 20.32 millimetres, or 1.05 by 0.80 inches; the smallest, 22.35 by 19.30 millimetres, or 0.88 by 0.76 inch.

The type specimen, No. 24454 (Pl. 1, Fig. 23), from a set of two eggs, Ralph collection, was taken in Estes Park, Colorado, on June 19, 1891, and represents about an average-sized specimen of this species.

## 55. Phalænoptilus nuttalli nitidus Brewster.

FROSTED POOR-WILL.

*Phalænoptilus nuttalli nitidus* Brewster, Auk, IV, April, 1887, 147.
(B 113, part; C 266, part; R 355, part; C 398, part; U 418*a*.)

Geographical range: Apparently similar to that of the Poor-will.

The Frosted Poor-will, a lighter-colored and grayer bird than Nuttall's Poor-will is likely to prove only a color phase of the latter, especially as the known range of the two appears to be practically identical, was first described by Mr. William Brewster in "The Auk" (Vol. IV, 1887, p. 147), from specimens taken on the Nueces River, Texas, February 27, 1886. It has since then been met with in southeastern California, Arizona, southern New Mexico, Colorado, and Kansas. Its general habits appear to be entirely similar to those of the preceding species, but there is as yet not sufficient material available to enable one to come to any positive conclusions about the proper status of this pale form. The late Col. N. S. Goss, in his work on the "Birds of Kansas, 1891" (p. 346), makes the following pertinent remarks on this subspecies: "This bird does not appear to differ in habits, actions, or size from *P. nuttalli*, and I am impressed with the thought that it may possibly prove to be a dichromatic phase, like that of the Screech Owl (*Megascops asio*), rather than a subspecies, as now entered."

The very fact that it can not be considered as having a range of its own where the typical Poor-will is not also found seems to confirm this view. One of the lightest-colored specimens of this pale form which I have seen (an adult female) was secured in Death Valley, California, on January 28, 1891, and is now in the ornithological collection of the United States Department of Agriculture, in this city. Other specimens from the same region are typical *Phalænoptilus nuttalli*, and both phases winter to some extent in these desert regions. A set of eggs of this race, taken with the parent, in Riley County, Kansas, on June 26, 1889, by Mr. Eben M. Blachly, are now in the Goss collection in the Public Museum at Milwaukee, Wisconsin. They were laid upon the bare ground, under a bunch of grass upon the prairie, near the edge of a cornfield; they measure 1.05 by 0.79 and 1.03 by 0.78 inches; or 26.67 by 20.07 and 26.16, by 19.81 millimetres. There are no absolutely identified eggs of this subspecies in the United States National Museum collection, and they are indistinguishable from those of the Poor-will.

## 56. Phalænoptilus nuttalli californicus Ridgway.

DUSKY POOR-WILL.

*Phalænoptilus nuttalli californicus* Ridgway, Manual of North American Birds, 1887, 588, footnote.

(B 113, part; C 266, part; R 355, part; C 398, part; U 418 *b*.)

Geographical range: Pacific coast regions, from California north to Washington (?), south to northern Lower California.

The range of the Dusky, also known as the "California," Poor-will is confined to the moist coast districts of California, and probably to similar localities in Oregon and Washington. Messrs. Lyman Belding and A. W. Anthony likewise report it from Tia Juana and the San Pedro Martir Mountains, in northern Lower California. The most typical examples of this dusky race come from localities west of the coast range in California, while the birds of the interior and the western slopes of the Sierra Nevadas are, more or less, intermediate between this and the common Poor-will. Its breeding range is coextensive with its distribution in the United States. Mr. F. Stephens writes me: "The Dusky Poor-will is frequently heard in the spring and fall, and a few winter in sheltered valleys near the coast in San Diego County, but it is apparently a rare summer resident in southern California, and I have never taken its eggs." Mr. Charles A. Allen, of Nicasio, California, considers it a common summer resident in Marin County, where it arrives about the first week in March and remains during the breeding season.

Mr. R. H. Lawrence writes me from Monrovia, Los Angeles County, California, as follows: "The California Poor-will is pretty common here. I first heard its notes on May 3. According to my hearing, the words 'Pearl-rab-it' give a fair idea of its call in letters. There is a kind of chuck or catch-breath after the first two syllables which really makes the call have three. It is clearly given, and the first two syllables can be heard at a considerable distance; when excited more than commonly this call note is reiterated with animation for a short time, but it is generally given with slight pauses after each call, then a longer interval of silence follows as the bird moves to another place. While flying in sight I have never heard it give any sound. On August 1, while walking along the road to Duarte, about 10.30 p. m. on a moonlight night, I flushed one; it flew just ahead of me till I had passed its nesting place, when it wheeled around and alighted there again, seeming to nestle down to the ground, which was packed hard just there. On approaching it again, it flew off a little farther along the road; when startled it gave quickly, two or three times in succession, a low, soft note, like 'pweek, pweek, pweek,' which could only be heard a few yards away.

"On May 5, 1893, while hurrying to catch a train, along a road following the edge of a wash, a boy stopped me to show me a nest of the California Poor-will; we flushed the bird after nearly treading on her, looking about our feet

for the right spot, when she flew a few yards and alighted. A single egg lay there in a slight depression on the clean and somewhat coarse gravel, which was rather smooth for a few feet about. Around was the usual brushy chaparral of the wash. The egg was brought to me by the boy in the evening, with the bird, and a slightly smaller one had been taken the day previous from the same nest."

Mr. Lawrence kindly presented these eggs to the United States National Museum collection, as well as the parent. This is not quite a typical *Phalænoptilus nuttalli californicus*, but it approaches this subspecies closer than the true *P. nuttalli*. The fact that the female returned to lay her second egg in the same spot from which the first had been taken the day before shows how tenacious these birds are to a locality once chosen for a nesting site. To further confirm this, Mr. Rolla H. Beck writes me that he shot two of these Poor-wills in June, 1894, in Monterey County, within a few feet of the spot where he tried to kill one with a fishing pole two years previously.

Mr. Walter E. Bryant, in his "Catalogue of the Birds of Lower California," makes the following remarks about this subspecies: "Noted at several places between Tia Juana and San Pedro Martir by Mr. Belding. Mr. Anthony has met with it up to 8,000 feet altitude, and says it winters in the low hills near the coast. Poor-wills were heard every evening on the steep hillsides at Comondu and at various localities. The only specimen secured, a male, was taken at Pozo Grande, March 19, 1889. I followed the bird some time before getting a shot, and each time that it was frightened it flew about 100 yards and alighted on cactus about 3 feet high. The Mexicans call them 'Tapa-camino' when they see them in the trail at dusk; but they also call the Night-hawks by the same name. At Comondu they were known as 'Cow-day,' from the almost perfect resemblance of their note to those words. In upper California the birds, which I have frequently heard, utter the notes rapidly, and sounding 'poor-will' clearly; in Lower California the sounds are given quite slowly, and resemble the words 'cow-day' rather than 'poor-will.'"[1]

The only set of eggs of this subspecies in the United States National Museum collection is the one already referred to, presented by Mr. R. H. Lawrence. These two eggs are indistinguishable from those of the common Poor-will. Their ground color shows the same pale creamy tint, with a faint pinkish tinge, and their shape is also similar. They measure 26.42 by 19.30 and 25.15 by 19.30 millimetres, respectively, or 1.04 by 0.76 and 0.99 by 0.76 inches.

The type specimen, No. 25937 (not figured), from a set of two, taken near Monrovia, California, on May 4, 1893, was presented by Mr. R. H. Lawrence, as already stated.

[1] Proceedings of the California Academy of Sciences, 2d series, Vol. II, 1889, pp. 287, 288.

## 57. Nyctidromus albicollis merrilli Sennett

MERRILL'S PARAUQUE.

*Nyctidromus albicollis merrilli* Sennett, Auk, V, Jan., 1888, 44.
(B —; C —; R 356, part; C 395, part; U 419.)

Geographical range: Southern Texas; south through northeastern Mexico to the Isthmus of Tehuantepec.

The range of Merrill's Parauque within the United States is a rather restricted one, being mainly confined, as far as known, to the lower Rio Grande Valley and southern Texas. The most eastern point from which it has yet been reported is Aransas County, where Mr. H. P. Attwater recently shot a specimen near Rockport. It is known to be fairly common in the vicinity of Corpus Christi. Mr. D. B. Burrows also met with it on the Nueces River, and these points probably mark the eastern limits of its range. We are indebted to Dr. James C. Merrill, United States Army, for the discovery of this handsome subspecies within our borders, who took the first specimen within the limits of Fort Brown, Texas, on April 1, 1876, and on May 2 he also obtained the eggs. Since then it has been found to be a common summer visitor in the lower Rio Grande Valley, and a number winter there as well; but the majority pass south into eastern Mexico, usually returning again to their breeding grounds early in March.

In speaking of the habits of this subspecies, Dr. Merrill says: "It frequents shady thickets and copses (where these can be found), and, when flushed, dodges rapidly and silently among the bushes, but soon alights, only to repeat the short flight when again approached. The eggs are deposited in such a situation, usually at the foot of a bush. The parent, when startled from her eggs, makes no attempt to decoy one away, but, flying a few yards, alights to watch the intruder, frequently raising herself on her legs and nodding in a curious manner, uttering at the same time a low, whining sound. Their notes are among the most characteristic night sounds of the lower Rio Grande, and are constantly heard at evening during the summer months. They consist of a repeated whistle resembling the syllables 'whew-whew-whew-whew-whe-e-e-e-e-w,' much stress being laid upon the last, which is prolonged. The whole is soft and mellow, yet can be heard at a great distance. The preliminary 'whews' vary somewhat in number, and late in the season are often omitted altogether." * * *

"On the 15th of May, 1876, I found a set of eggs near camp, at Hidalgo, and on returning in about fifteen minutes to secure the parent, who had disappeared among the thickets, I found that she had removed the eggs, although they had not been touched."[1]

Mr. D. B. Burrows has also kindly furnished me with the following notes on Merrill's Parauque: "While in the lower Rio Grande country, in Starr County, Texas, during the fall of 1890, I first met with this bird. It seems to be a resident species, for I met with it during the winter months as well as during the spring

[1] Proceedings U. S. National Museum, Vol. I, 1878, p. 145.

and summer. When the nesting season is over the birds remain quiet, and their peculiar whistling note is not heard with regularity, and yet, on very warm nights during each of the winter months, I have occasionally heard them. During the winter the birds may be flushed from the dense thickets in the bottom lands, but as the nesting season approaches they leave these close retreats and seek more open ground. During the daytime the birds were commonly found on the ground at the foot of a growth of bushes or among fallen branches, and I have occasionally found them perched, nighthawk-fashion, upon a low branch not more than a foot from the ground. When closely approached, they dart quickly forward in a zigzag course, dropping as suddenly to the ground. This flight is short, usually not more than 50 or 60 feet, and when settled they commonly remain perfectly quiet until again flushed. They have a peculiar way of turning or facing about as they strike the ground, so that they can better watch the approaching danger. They lie so close that it is with great difficulty that they can be detected, unless the spot is carefully marked. In a number of instances, where the bird seemed to feel that it was observed, I have had them go through a peculiar bowing movement, resembling that of the Burrowing Owl, except that the body is raised from its completely prostrate position. Often when flushed they will utter a peculiar note, sounding like the syllable 'kop,' uttered with an explosive effect. On several occasions, in the fall of the year, when returning from a hunt, I have been startled by a peculiar 'put, put,' which caused me to stop short and grasp my gun a little tighter, feeling sure that I had disturbed a wild turkey and that this was his warning note. Cautiously approaching the spot, I have found that it was made by a Parauque, which was usually perched upon the extremity of a low, dead limb, or on the top of a bush. At these times I found that the bird was watching for food, and at intervals would leave the perch, dart off a short distance as if in pursuit of an insect, and as quickly return, in very much the same manner that the Whip-poor-will is accustomed to do. I believe that these birds are strictly insectivorous; but I have never made an examination of the stomach except in one instance. The stomach of this bird, killed in January, showed parts of the feet and wings of small beetles and other insects.

"At the approach of the breeding season and as early as the middle of March the peculiar whistle of the Parauque becomes general, and along the lower Rio Grande, where they are common, it may be heard on all sides. This species is strictly nocturnal. When flushed in the daytime they avoid striking against bushes with wonderful skill, but they are quite sensitive to a strong light. The birds begin to call as the dusk of the evening comes on. The commonest call is a long-drawn 'ko, whe-e-e-e-e-w,' much prolonged, and raised to a high pitch toward the last. This is repeated often and with great energy, and on a still night may be heard at a long distance. At other times the first syllable is omitted. Again it is varied by a repetition of the first syllable, as 'ko, ko, ko, ko-whe-e-e,' the first syllables repeated deliberately, and the last not so long drawn and suddenly cut short.

"I have never found the Parauque nesting in the dense thickets, where they hide during the winter. They seek the more open ground, the high, level spots near the river, or up some arroya, among scattering bushes and pear cactus, but never on the rocky hills, where the Texan Nighthawk is frequently found. In one instance a nest was found at the edge of a cultivated field. The eggs are placed on the bare ground, with no attempt at nest building, and usually at the foot of a clump of bushes. The bird, when flushed from the nest, quietly darts off and drops to the ground but a short distance away.

"During the winter and spring (1894) I found the Parauque to be fairly common along the lower course of the Nueces River, but I do not think that it is to be found much farther east, and I know that a little farther north its place is taken by the Chuck-will's-widow. Here, as on the Rio Grande, I found it resident throughout the year, and although it breeds there, I was not successful in finding any nests."

The food of Merrill's Parauque, like that of the rest of the *Caprimulgidæ*, consists mainly of night-flying insects, such as moths, beetles, etc. The crop of a specimen shot by Mr. H. P. Attwater, near Rockport, Texas, was filled with fireflies, *Photinus pyralis?*. In the lower Rio Grande Valley fresh eggs are occasionally taken in the second week in April, but the breeding season is not at its height before May and lasts well into June. The earliest breeding record I have is April 14; the latest, June 27; in both cases the eggs were fresh. It is probable that two broods are, at least occasionally, raised in a season.

The eggs of Merrill's Parauque approach an elliptical ovate more than an elliptical oval, one end being always more perceptibly pointed than the other. The shell is close-grained, rather thin, and either without gloss or only moderately glossy. Their ground color varies from cream and vinaceous buff to a rich salmon buff, and this is more or less abundantly spotted and splashed with buffy pink, ecru drab, pale lavender, and more rarely with deeper shades of cinnamon rufous. In an occasional specimen the markings are mainly confined to the larger end, but in the majority they are pretty evenly scattered over the entire surface of the egg. A few are but slightly marked, and unless carefully examined might pass for immaculate. They are handsome eggs, and do not resemble any others of the *Caprimulgidæ* found in the United States.

The average measurement of forty-one specimens in the United States National Museum collection, mostly from the Ralph collection, is 31.24 by 22.66 millimetres, or about 1.23 by 0.89 inches. The largest egg of the series measures 33.27 by 24.13 millimetres, or 1.31 by 0.95 inches; the smallest, 27.18 by 20.57 millimetres, or 1.07 by 0.81 inches.

Of the type specimens, No. 25289 (Pl. 2, Fig. 1), from a set of two eggs, Ralph collection, taken on May 16, 1892, represents one of the better marked examples, while No. 26335 (Pl. 2, Fig. 2), also from a set of two and from the same collection, taken on April 16, 1893, represents one of the lighter-marked types of this species. Both were obtained in Cameron County, Texas.

## 58. Chordeiles virginianus (Gmelin).

NIGHTHAWK.

*Caprimulgus virginianus* Gmelin, Systema Naturæ, I, ii, 1788, 1028.
*Chordeiles virginianus* Swainson, Fauna Boreali Americana, II, 1831, 496.
(B 114, C 267, R 357, C 399, U 420.)

Geographical range: Eastern North America; north in the Dominion of Canada to Nova Scotia, New Brunswick, Quebec, northern Ontario (Moose Factory), and Keewatin (Fort Churchhill), in latitude 59°, and thence in a northwesterly direction to the Mackenzie River Valley, in the vicinity of Fort Good Hope, to about latitude 65°; west in the United States to the eastern border of the Great Plains and, sporadically only, along the southern boundary of the Dominion of Canada and the northern border of the United States, in the wooded districts, to southern British Columbia, Washington, Oregon, and northern California; south in winter to the Bahama Islands, Central America, and the greater part of South America.

The range of the Nighthawk, also known as "Bull-bat," "Mosquito Hawk," "Will o' the Wisp," "Pisk," "Piramidig," and sometimes erroneously as "Whip-poor-will" (being frequently mistaken for this species), is quite an extended one. It is only a summer visitor throughout the United States and the Dominion of Canada, generally arriving from its winter haunts in the Bahamas, Central and South America in the latter half of April, reaching the more northern parts about a month later, and leaving the latter again in large straggling flocks about the end of August, moving leisurely southward and disappearing gradually along our southern border about the latter part of October. Its migrations are very extended and cover the greater part of the American continent.

Its breeding range in the United States and the Dominion of Canada is coextensive with its geographical distribution. On the Atlantic Seaboard it reaches the northern limits of its range in about latitude 51°, in the Province of Quebec; and although it has been recorded from Labrador, I fail to find any positive evidence of its occurrence there. Several specimens have been taken at Moose Factory, northern Ontario; and among a collection of skins from Fort Churchill, on the west shore of Hudson Bay, in about latitude 59°, now in the Edinburgh Museum, is an adult female taken by Dr. Gillespie, jr., while stationed there as an officer of the Hudson Bay Company, previous to 1845. Thence it probably ranges in a northwestern direction to the Mackenzie River Valley, north of Fort Simpson. Mr. James Lockhart sent a skin to the United States National Museum, obtained near Fort Good Hope, Northwest Territory, in about latitude 66°, which is the northernmost record I have been able to find. The western limits of the Nighthawk are not so easily defined. In this direction it reaches the eastern borders of the Great Plains, and it is also found sporadically throughout the better-timbered parts along the southern boundary of the Dominion of Canada and the northern border of the United States, west to southern British Columbia, Washington, Oregon, and northern California (Mount Shasta), where it is replaced in the more open portions of these regions by the lighter-colored western representative, *Chordeiles virginianus henryi*. I was quite

surprised to find that skins taken by me in the vicinity of Fort Klamath, Oregon, and now in the United States National Museum collection, are almost indistinguishable from typical specimens from the eastern United States; they certainly approach the eastern bird far more closely than the lighter-colored western subspecies. The same remarks apply to specimens from southern British Columbia, Washington, and northern California. Along the respective borders of their ranges the two forms overlap sometimes for considerable distances, the present species occupying the outskirts of the better-timbered tracts, while the western race is principally restricted to the more open prairie country.

The Nighthawk is generally a common summer resident throughout the eastern United States north of latitude 35°, while south of this it is more irregularly distributed, but breeds, to some extent at least, in all of our Southern States, excepting perhaps Florida and the immediate vicinity of the Gulf coast. Its common name is somewhat of a misnomer; it is by no means nocturnal in its habits; in fact, it is diurnal and crepuscular, and it is not at all unusual to see numbers of these birds on the wing on bright sunny days; but it does most of its hunting in cloudy weather and in the early mornings and evenings, retiring to rest soon after it becomes dark; but during bright moonlight nights it keeps up its flight somewhat later and I have heard its calls as late as eleven o'clock.

It is one of our most graceful birds on the wing and its aerial evolutions are truly wonderful; one moment it may be seen soaring through space without any apparent movement of its pinions, and again its swift flight is accompanied by a good deal of rapid flapping of the wings, like that of our Falcons, and this is constantly more or less varied by numerous twistings and turnings. While suddenly darting here and there in pursuit of its prey I have seen one of these birds shoot almost perpendicularly upward with the swiftness of an arrow in pursuit of some insect. Its tail appears to assist it greatly in these sudden zigzag changes, being partly expanded during most of its complicated movements. I know of no more interesting sight than to watch a number of Nighthawks while engaged in feeding, skimming close to the ground or over the waters of some pond or lake, gliding swiftly along in all kinds of serpentine gyrations with the utmost grace and ease, and no matter how limited the space may be and how numerous the birds, none will ever get in the way of each other; all their movements seem to be accomplished in the most harmonious manner.

The Nighthawk is a social bird while on the wing, and I have seen fully a hundred at one time hawking over a small mountain meadow or a pond, and they certainly seemed to enjoy each other's company. While on the wing their querulous and squeaky call note, sounding like "æh-eek, æh-eek" or "speek-speek," is repeated at different intervals. Mr. W. E. Grover describes this note as a sharp, mowing "mueike," and it is also said to resemble the word "beard," uttered in a whisper. When disturbed while sitting on its eggs it usually utters a low, purring or chuckling sound; and during early spring the male frequently

descends rapidly from high above, the vibration caused by the air passing through the primaries producing a peculiar booming sound which has been compared to that made by blowing through the bunghole of an empty barrel; this comes perhaps as near to it as it can be described. It is amazing to see what perfect control these birds have over themselves during this peculiar performance; descending as they do almost with the rapidity of a lightning flash, one would think they could not possibly arrest their downward course in time to prevent being dashed to the ground; but at the proper moment, by a single reverse movement of their wings, they rise in a gradual curve, to resume their flight or repeat the same performance. This aerial play seems to be principally confined to the mating and breeding season. I have never observed it later in the year.

On the ground, however, the Nighthawk does not show to such good advantage and its movements here are slow, unsteady, and evidently more or less laborious. Its food consists mainly of insects, such as flies and mosquitoes, small beetles, grasshoppers, crickets, and the smaller night-flying moths, and I believe that all are caught on the wing. It must be considered as an eminently useful and beneficial bird and deserves the fullest protection. Unfortunately, however, the Nighthawk is considered as a legitimate game bird in certain sections, and many are killed yearly for food, as well as for sport, simply to show the gunner's skill in marksmanship; and the good they do through the destruction of millions of troublesome insects is entirely lost sight of. Its favorite haunts are the edges of forests and clearings, burnt tracts, meadow lands along river bottoms, and cultivated fields, as well as the flat mansard roofs in many of our larger cities, to which it is undoubtedly attracted by the large amount of food readily obtainable in such localities, especially about electric lights, and also the convenient and secure nesting sites afforded on the gravel-covered surfaces of the roofs, which may be found everywhere in abundance. During the heat of the day the Nighthawk may be found resting on horizontal limbs of trees, on fence rails, the flat surface of some lichen-covered rock, on stone walls, old logs, chimney tops, and on railroad tracks. When perched on the limb of a tree, a log, or a fence rail, it always sits lengthwise, and excepting during the mating and breeding season I have rarely seen one on the ground.

Strictly speaking, the Nighthawk is not a forest bird, as it only frequents their outskirts, or extensive clearings and burnt tracts, while it avoids the denser and heavier growth of timber. It does not object to sunshine like the Whip-poor-will and the Chuck-will's-widow, and apparently is not affected by the light in the way they are.

In New England and most of the other Northern States nidification rarely commences before the first week in June (more often during the second), and continues well into July. The earliest date I know of on which its eggs have been taken is May 27 in southern Michigan; the latest, July 19 in southern Pennsylvania. In the more southern parts of its range it usually nests in the first half of May, and young are occasionally found by the end of this month. Like the rest of the *Caprimulgidæ*, the Nighthawk makes no nest, but deposits its

two eggs on the bare ground, frequently in very exposed situations, sometimes on some little elevation, or in slight depressions on flat rocks, between the rows in corn or potato fields, in pastures, on gravel bars, and cinder piles near furnaces, and within recent years they also nest more and more frequently on the flat, gravel-covered roofs of houses in our larger cities. They undoubtedly find such nesting sites very convenient and secure, but the intense heat to which the eggs and young are necessarily exposed during the day must be something fearful, and I have no doubt that some of the latter perish, and that not a few of the eggs become addled, from this cause. In favorite localities the Nighthawk breeds occasionally in small colonies, and several pairs may be found breeding in close proximity to each other. I believe, as a rule, only a single brood is raised in a season, but if the first set of eggs is taken, a second one will be laid about a week after, which consists occasionally of only a single egg.

The Nighthawk was quite common along the borders of the open pine forests near Fort Klamath, Oregon, and all the nests found here were placed close to the edge of the perpendicular rim rock which skirts Klamath Valley toward the east. The eggs were invariably laid within a foot of the edge, and I presume such places were selected for protective purposes to lessen the danger of their being stepped on by cattle or horses. These birds always pick out a dry and well-drained spot in which to lay their eggs, and if discovered on the nest, the parent attempts by all the well-known tactics of ground-breeding birds to draw the intruder away from the spot, fluttering in front of him, just out of reach, uttering at times low cries of distress, etc. Occasionally the eggs or young are removed quite a little distance by the parent, but this habit is by no means universal. A nest examined by me on June 14, 1893, in Herkimer County, New York, was found in a slight natural depression on a well-drained fern-covered side hill, in an old clearing, close to a small lake. The eggs laid on the bare ground about an inch or more apart, which seems to be their usual position, the ends pointing in the same direction; when covered, each rests against opposite sides of the breast of the parent and is held in place by the wings. I purposely flushed this bird several times to note her actions. It allowed me to approach her within a couple of feet each time before flying off, and then it only retired a short distance, alighting on a prostrate old log close by, remaining perfectly silent. About five minutes after I left, it returned and settled again on the eggs while I was still in plain view. I flushed her again shortly afterwards, and she repeated the same performance; but the third time she uttered a low, purring noise as she flew, probably a note of protest. I was in hopes that she might try to remove her eggs and I would have a chance to observe how this was done, but she failed to gratify my wishes. The male did not put in an appearance during the two hours spent in watching the nest. As nearly as I can ascertain, incubation lasts about sixteen days, and both sexes assist in this duty. The young are fairly well covered with gray down when first hatched; they grow rapidly, and while small one of the parents is always close by.

Only two eggs are laid to a set (on alternate days) and incubation begins with the first one deposited. The shell is strong, close-grained, and generally moderately glossy; in shape they vary from elliptical ovate to elliptical oval, the former prevailing in the majority, one end being a trifle smaller than the other. Their ground color is quite variable, and ranges from a pale creamy white through different shades of cream, olive buff, and olive gray, and they are profusely blotched and speckled with different shades of slate black, drab, smoke and lilac gray, and tawny olive, mixed with lighter shades of pearl gray, lavender, and plumbeous. In some specimens the markings are fine and uniform in size, almost obscuring the ground color; in others they are less numerous, but large and prominent. There is an endless variation in their markings. Scarcely any two sets resemble each other closely, and I consider the egg of the Nighthawk one of the most difficult ones known to me to describe satisfactorily.

The average measurement of eighty-one specimens in the United States National Museum collection is 29.97 by 21.84 millimetres, or 1.18 by 0.86 inches. The largest egg of this series measures 33.53 by 22.86 millimetres, or 1.32 by 0.90 inches; the smallest, 27.68 by 20.57 millimetres, or 1.09 by 0.81 inches.

The type specimen, No. 9813 (Pl. 3, Fig. 1), from a set of two taken near Dubuque, Iowa, on May 28, 1865, by the Messrs. Blackburn, represents one of the larger and heavier marked specimens. No. 24968 (Pl. 3, Fig. 2), Ralph collection, from a set of two taken by Dr. William L. Ralph in Herkimer County, New York, on June 24, 1891, represents a small specimen with an olive-gray ground color and rather dark markings; while No. 20457 (Pl. 3, Fig. 3), likewise from a set of two, Bendire collection, was taken by the writer near Fort Klamath Oregon, on July 6, 1882, and represents one of the lighter-colored types.

## 59. Chordeiles virginianus henryi (Cassin).

WESTERN NIGHTHAWK.

*Chordeiles henryi* Cassin, Illustrations of the Birds of California, Texas, etc., I, 1855, 233.
*Chordeiles virginianus* var. *henryi* Coues, Key, 1872, 181.
(B 115, C 267*a*, R 357*a*, C 400, U 420*a*.)

Geographical range: Western North America; north to central British Columbia to about latitude 55° and through the prairie districts of southern Alberta, Assiniboia, and western Manitoba; east in the United States to western Minnesota, Iowa, northern and central Illinois, Kansas, the Indian Territory, western and southern Texas; south over the table-lands of Mexico, and in winter through Central America, over the greater part of South America to Patagonia.

The Western Nighthawk, a lighter-colored subspecies than the preceding, is a common summer resident throughout a considerable portion of western North America, but its range is likewise a rather irregular one. On the whole, it is more of a prairie bird than the former, but it is by no means confined to the plains alone; it appears to be equally at home on the more open, barren

mountain ranges throughout the West, where it is found as a summer resident up to altitudes of 10,000 feet. None of these birds appear to winter within the limits of the United States. It usually makes its appearance along our southern border about April 1, and returns to its winter haunts again late in September. Occasionally a few stragglers may arrive somewhat earlier in the spring, as Mr. H. P. Lawrence writes me: "I am sure I heard the cry of a Nighthawk at Olympia, Washington, on March 29, 1890. They are common here in the summer. I have often seen them take dust baths in the evening in the paths near an adjacent cottage." Mr. R. MacFarlane reports this subspecies as a common summer resident in the vicinity of Forts St. James and St. George, in the interior of British Columbia, in about latitude 55°, and he sent two sets of eggs and a skin from there to the United States National Museum collection in 1889. These points mark, as far as known, the northern limits of its range. I know it to be common throughout the sagebrush plains and the prairie regions of northern Washington, Idaho, and Montana, and there is no doubt that it also occurs in similar regions throughout eastern Alberta, Assiniboia, and western Manitoba; it is likely to be found farther north as well. The eastern limits of its range extend well into Minnesota, Iowa, northern and central Illinois, where it is the prevailing form found throughout the prairie regions of these States. It is also common throughout the middle and western portions of Kansas, the Indian Territory, and southwestern Texas. Along our southern border it appears to be rather rare, and I observed but very few of these birds in the lower valleys and desert regions in southern Arizona. Here they appear to be mainly confined to the barren mountain ranges, and only breed sparingly at the lower altitudes. Dr. Edgar A. Mearns reports it, however, to be the common form of Nighthawk in the Animas Valley, near the international boundary line, in southwestern New Mexico, and he took a set of eggs here on July 3, 1892, which are now in the United States National Museum collection. In his interesting paper, "Observations on the Avifauna of portions of Arizona," the Doctor makes the following remarks on this subspecies:

"I have never known this species to infringe on the territory of the Texan Nighthawk during the breeding season; each keeps to its own ground, the latter being confined to the region below the pines, and the former residing in the pines and spruces, breeding in great numbers in these limited areas. A single migrant was taken at Fort Verde on May 9, 1885. Two fresh eggs were taken at Flagstaff on June 18, 1887, in a level place, bestrewn with volcanic scoria, beneath the pines. In our summer camp, near the summit of the Mogollon Mountains, a small beetle was annoyingly abundant, flying into our tents in great numbers during the day and swarming around our log fires at night. As the twilight gathered, hundreds of these Nighthawks appeared upon the scene, preying upon the troublesome insects. Careless of our presence at the fires and of the noisy hilarity of camp, they flitted through the smoke with astonishing freedom from diffidence, capturing myriads of the hated beetles as they passed and repassed above, between, and around us, until their flickering forms

were as familiar as the stirring of the pine boughs overhead, and the fanning of their wings almost as little heeded. A couple of young, recently hatched, were found near the camp on July 27, 1887, showing that two broods are reared the same year, or that its season of reproduction is quite protracted. The voice of this species is quite unlike that of *Chordeiles texensis*."[1]

In southern California it is a somewhat rare summer resident, but in the middle and northern portions of this State it is not uncommon. In the lower Rio Grande Valley, throughout western Texas, the Plains, and the Great Basin regions it seems to be generally distributed, and appears to be equally at home in the hottest desert districts—like Death Valley, for instance, below sea level—as on the higher mountain summits in the Sierra Nevadas and the Rocky mountains. I found the Western Nighthawk fairly common in the vicinity of all the military Posts where I have been stationed in the West, and I have not observed the slightest difference in its general habits. call notes. etc. from those of its eastern relatives.

In the lower Rio Grande Valley, in Texas, nidification commences occasionally in the last week in April and lasts well into July, and here two broods are undoubtedly raised in a season, while in the more northern portions I believe one is the rule, and here eggs are rarely found before the middle of June, and frequently not before the first week in July. Its nesting habits are also similar; it breeds in corresponding situations, excepting, as far as I know, the flat roofs of houses. I have not yet heard of their breeding on housetops in any part of their range. A set of eggs of this subspecies was found by me on July 3, 1875, in the foothills of the Blue Mountains, some 6 miles northeast of Camp Harney, Oregon, laid among some pebbles on the bare ground under a little sage bush. The sitting bird allowed me almost to touch it, and was very reluctant to abandon its eggs, which were but slightly incubated. On my approach, it ruffled its feathers and emitted a hissing sound, resembling somewhat the spitting of a cat when mad. Their favorite nesting places in that vicinity were the crests of gravelly ridges, always selecting a well-drained spot, where the rains could not chill the young or eggs. Bare, rocky table-lands are also frequently resorted to for similar purposes, and less often the flat tops of bowlders. Extensive burnt tracts also furnish favorite abiding places for them in the more northern portions of their range; in fact, in such localities they are fully as abundant as on the more open sagebrush plains. They are very devoted parents. Mr. W. G. Smith, of Loveland, Colorado, writes me: "I had one swoop down several times at a dog that used to accompany me, finally driving it away. I think the bird had a nest close by and resorted to this means to protect its young or sitting mate."

The eggs of the Western Nighthawk, both in shape and markings, are scarcely distinguishable from those of the eastern bird, and the same description will answer for both; on the whole, however, the lighter-colored types seem to predominate over the darker ones. The eggs figured of the preceding species will also answer for this, and the single egg figured of this subspecies can likewise be matched among the series of the former.

[1] The Auk, Vol. VII, 1890, pp. 254, 255.

The average measurement of a series of sixty-three eggs in the United States National Museum collection is also practically the same, being 29.97 by 21.61 millimetres, or 1.18 by 0.85 inches. The largest egg of the series measures 32.51 by 22.86 millimetres, or 1.28 by 0.90 inches; the smallest, 27.43 by 20.83 millimetres, or 1.08 by 0.82 inches.

The type specimen selected, No. 26125 (Pl. 3, Fig. 4), from a set of two eggs, was taken by Dr. Edgar A. Mearns, United States Army, in the Animas Valley, near San Luis Springs, New Mexico, on July 3, 1892, and represents a very finely and profusely marked specimen, in which the ground color is not very readily perceptible.

## 60. Chordeiles virginianus chapmani (Sennett).

FLORIDA NIGHTHAWK.

(*Chordeiles popetue*) *chapmani* (Sennett MS.) Coues, Auk, V, January, 1888, 37.
*Chordeiles virginianus chapmani* Scott, Auk, V, April, 1888, 186.
(B —; C —; R 357*b*, C 401, U 420*b*.)

Geographical range: Florida and the Gulf coast; west to southern Texas; in winter south to the Bahama Islands and through eastern Mexico to Central America. Casually north to North Carolina (Macon).

The range of the Florida Nighthawk, also commonly called "Bull-bat" or simply "Bat," a somewhat smaller and darker-colored bird than the common Nighthawk, is confined, as far as known, to Florida and the Gulf coast westward to southern Texas. I have no positive breeding records from outside of Florida, but it is more than likely that it breeds along the entire Gulf coast as far west at least as Aransas County, Texas. Mr. H. P. Attwater kindly sent me several skins taken near Rockport, in the above county (fall specimens), which are undoubtedly referable to this subspecies. There is also a skin in the United States National Museum collection taken by Dr. Elliott Coues near Fort Macon, North Carolina, on June 10, 1869, and I have no doubt that it will yet be found as a regular summer visitor along the south Atlantic coast of Georgia and South Carolina. There is not sufficient material available, excepting from Florida, to enable me to define its breeding range more definitely outside of this State. The Florida Nighthawk is only a summer resident of the United States, usually arriving from its winter haunts in the south about the middle of April and returning again late in October. Mr. Attwater informs me that this Nighthawk remains later in the fall in the vicinity of Rockport than the Western Nighthawk, and that its favorite haunts there are the oak openings, while the latter more often frequents the open prairie.

Its general habits, call notes, food, etc., seem to be similar to the two preceding species in almost every respect. Mr. W. E. D. Scott describes a young bird, apparently five or six days old, as follows: "The down is dirty white beneath, and on all other parts is the same dirty white, mixed with spots

of black, giving the bird an appearance above not unlike the young of *Ægialitis wilsonia*, save that the down is longer."[1]

Mr. Frank M. Chapman, in his "List of Birds Observed at Gainesville, Florida," speaking of this subspecies, states: "Bull-bat or (as it is more commonly termed) 'Bat' shooting is here a popular pastime, great numbers being killed for food, and in August, when the birds have gathered in flocks, favorite fields may be occupied at nightfall by as many as a dozen gunners."[2]

Dr. William L. Ralph has taken several nests and eggs, with the parents, in Putnam County, Florida, which are now in the United States National Museum collection. Here, during the breeding season at least, the Florida Nighthawk frequents mainly low, flat pine woods, especially such as have recently been burnt over, the eggs generally lying on the bare ground. Sandy soil seems to be preferred for nesting places. One set of eggs was found by him under a small orange tree in an orange grove on the side of a sandy hill; three others were taken in flat pine woods, and in one instance the eggs laid on a few fragments of charcoal left where a fallen tree had been partly burnt, between the remaining part of the tree and the stump, about 3 feet from each. Nidification appears to be at its height in Putnam County, Florida, during May, and probably two broods are raised in a season.

The eggs of the Florida Nighthawk resemble those of the two preceding species closely, both in shape and in their ground color; but the markings, as a rule, are much darker and bolder, and the eggs are also somewhat smaller. The difference between them and those of their near relative, *Chordeiles virginianus minor*, is still greater, the latter being on the whole much lighter colored than those of the Western Nighthawk, resembling the eggs of *Chordeiles texensis* far more in this respect.

The average measurement of fifteen specimens in the United States National Museum collection, all from Florida, is 29.03 by 20.89 millimetres, or about 1.14 by 0.82 inches. The largest egg measures 30.94 by 20.57 millimetres, or 1.22 by 0.81 inches; the smallest, 27.43 by 20.32 millimetres, or 1.08 by 0.80 inches.

Of the type specimens, both from the Ralph collection, No. 24969 (Pl. 3, Fig. 5), from a set of two eggs taken near San Mateo, Florida, on May 9, 1885, represents one of the finer-marked examples, while No. 25823 (Pl. 3, Fig. 6), also from a set of two taken near Tomoka, Florida, on May 8, 1892, shows one of the darker-colored patterns.

[1] The Auk, Vol. V, 1888, p. 186. [2] *Ibid.*, p. 272.

## 61. Chordeiles acutipennis texensis Lawrence.

TEXAN NIGHTHAWK.

*Chordeiles acutipennis* var. *texensis* Baird, Brewer, and Ridgway, History of North American Birds, II, 1874, 406.

(Cf. Hartert, Catalogue Birds British Museum, XVI, 192, 616.)

(B 116, C 268, R 358, C 402, U 421.)

Geographical range: Southwestern United States, from southern and western Texas, southern New Mexico, and Arizona; north to latitude 38° in California (to San Joaquin and Stanislaus counties), southern Nevada, and southern Utah; east (casually ?) to southwestern Louisiana; south to Lower California and over the table-lands of northern Mexico; in winter to Costa Rica and Veragua, Central America.

Within the last few years the range of the Texan Nighthawk in the United States has been greatly extended. In California it is now known to occur as far north as San Joaquin and Stanislaus counties, in about latitude 38°, Mr. L. Belding having observed about a dozen of these birds on June 5, 1891, at Knight's Ferry, in the latter county, and one of these was secured by him. East of the Sierra Nevadas this species was met with by Dr. C. Hart Merriam and other members of his exploring party as far north as Bishop, in Inyo County, California, as well as at several points in southern Nevada and in the lower Santa Clara Valley, in Utah. In the latter valley Dr. Merriam found it breeding near St. George, securing a set of fresh eggs on May 13, 1891. It appears to be generally distributed throughout the arid desert regions of Arizona, and it is common in suitable localities throughout this Territory as well as through the southern portions of New Mexico, and it is also an abundant summer resident in the southern and western portions of Texas. Mr. E. A. McIlhenny has taken it in southwestern Louisiana, where it probably occurs only as a straggler. It also appears to be generally distributed throughout the greater part of Lower California.

Some of the habits of the Texan Nighthawk, the smallest representative of this genus found within the United States, are very similar to those of its somewhat larger relative, the Western Nighthawk. Like the last-named species, it is a very sociable bird at times; in suitable localities, for instance on the bottom lands bordering some of the larger streams within its range, it is very abundant, and I never saw so many Nighthawks anywhere as I did of this species one evening while camped near a slough close to the Gila River, while in route from Fort Yuma to old Fort McDowell, southwestern Arizona, in July, 1871. There were certainly several hundred making their evening meal on the numerous insects which abounded in that vicinity. Its flight is equally as graceful as that of the other Nighthawks, but it rarely soars as high as the former, and generally skims just over the tops of the bushes or close to the surface of the water. In fact, I have repeatedly seen them touch the surface, as if drinking or

catching insects, probably the latter. The ordinary call note uttered by it while on the wing, however, is quite different; it is still more squeaky than that of the Nighthawk, not so loud, and reminds me somewhat of the sounds made by a very young kitten in distress. It apparently does not indulge in the peculiar aërial performances, causing the booming sounds made by the other members of this genus so frequently heard during the mating and breeding season; and it is also more crepuscular, and unless accidentally flushed is rarely seen flying about in the daytime. Dr. James C. Merrill, United States Army, in his "List of Birds Observed in the Vicinity of Fort Brown, Texas," writes of this species as follows:

"Common summer visitor, arriving early in April. While *Chordeiles virginianus henryi* is usually found about prairies at some distance from houses, the present species is most plentiful just outside of Brownsville, and I have found several sets of eggs within the fort. These are usually deposited in exposed situations, among sparse chaparral, on ground baked almost as hard as brick by the intense heat of the sun. One set of eggs was placed on a small piece of tin, within a foot or two of a frequented path. The female sits close, and when flushed flies a few feet and speedily returns to its eggs. They make no attempt to decoy an intruder away. I have ridden up to within five feet of a female on her eggs, dismounted, tied my horse, and put my hand on the bird before she would move. This species is more strictly crepuscular than *Chordeiles virginianus henryi* or *Chordeiles virginianus*, and is very seldom seen on the wing during the day. The notes are a mewing call, and a very curious call that is with difficulty described. It is somewhat like the distant and very rapid tapping of a large Woodpecker, accompanied by a humming sound, and it is almost impossible to tell in what direction or at what distance the bird is that makes the noise. Both these notes are uttered on the wing or on the ground, and by both sexes."[1]

In some respects its habits resemble those of the Poor-will more than the Nighthawks. I have more than once seen several of these birds alight on the bare ground in front of my camp on Rillito Creek, near Tucson, Arizona, after sundown, and watched them hopping after insects or dusting themselves. They were very tame, often allowing me to walk to within four feet of them, when they would only fly a few yards and resume their feeding again.

The Texan Nighthawk usually arrives along the southern border of its range in the United States about the first week in April, and returns south again in the latter part of October. Throughout the more southern portions of its habitat it undoubtedly raises two broods in a season. The earliest breeding records I have (April 27 and 28) are from the lower Rio Grande Valley, in Texas; the latest (one of my own) is August 6, 1872, when I found a strongly incubated set of eggs near Tucson, Arizona.

Like the other members of the *Caprimulgidæ*, the Texan Nighthawk makes no nest, but deposits its two eggs on the bare ground, where they are fully

[1] Proceedings United States National Museum, Vol. I, 1878, p. 146.

exposed to the rays of the sun, or near the base of some desert shrub, which at best furnishes but little protection from the intense heat, and I have found its eggs on the parched gravelly mesas of southern Arizona, miles from the nearest water. Their favorite breeding resorts here are the dry, barren table-lands, the sides of canyons, and the crests of rocky hills. Although not absolutely certain, I believe the two eggs are deposited on alternate days, and incubation begins with the first egg laid. They are exceedingly difficult to detect on account of their similarity in color to their general surroundings, which usually harmonize very closely. The shell is strong, close grained, and rather glossy, while in shape the eggs are more variable than those of our other Nighthawks, ranging from oval to elliptical oval, and again to elliptical ovate. The ground color varies from pale gray (a sort of clay color) to pale creamy white, with a faint pinkish tint. This latter phase of coloration is rather unusual however. The whole surface is minutely marbled, speckled, or rather peppered, with fine dots of different shades of grays, lilac, and a few darker and coarser markings of fawn color, slate, and drab. Occasionally a specimen is found which, to the naked eye, appears entirely unmarked; but on more careful examination a few dark spots, mere pin points, can readily be noticed. They are much lighter colored than the average eggs of our other Nighthawks, and readily distinguished from these on this account, as well as from their smaller size.

The average measurement of fifty-five specimens in the United States National Museum collection is 26.84 by 19.61 millimetres, or about 1.06 by 0.77 inches. The largest egg of this series measures 29.72 by 21.08 millimetres, or 1.17 by 0.83 inches; the smallest, 23.11 by 18.03 millimetres, or 0.91 by 0.71 inch.

Of the type specimens (all selected from sets of two) No. 24210 (Pl. 3, Fig. 7), taken by Dr. C. Hart Merriam, on May 13, 1891, near St. George, Utah, represents an egg with a light ground color, and a peculiar and rare style of markings. No. 24312 (Pl. 3, Fig. 8), collected near Brownsville, Texas, on May 8, 1891, shows one of the darker and heavier marked styles. No. 25299 (Pl. 3, Fig. 9), from the same locality, taken May 16, 1892, represents a very uniform and evenly colored specimen, while No. 26351 (Pl. 3, Fig. 10), likewise from the same locality, taken May 8, 1892, represents about an average-colored egg of this species. The last three types are from the Ralph collection.

## Family MICROPODIDÆ. Swifts.

### 62. Cypseloides niger (Gmelin).

BLACK SWIFT.

*Hirundo nigra* Gmelin, Systema Naturæ, I, ii, 1788, 1025.
*Cypseloides niger* Sclater, Proceedings Zoological Society, June 27, 1865, 615.
(B 108, C 270, R 350, C 404, U 422.)

Geographical range: Mountains of western North America, mainly on the Pacific coast; north to British Columbia; east to eastern Washington, Nevada, and Colorado; south to California; and in winter, through Lower California and Mexico to Costa Rica, Central America (and the West India Islands?).[1]

The range of the Black Swift, also known as "Cloud Swift," is still rather imperfectly defined. As far as yet known it has only been observed in the Rocky Mountain region in Colorado, where it seems to be mainly confined to San Juan County, in the southwestern part of the State. Mr. A. W. Anthony writes me: "Here I found the Black Swift very abundant in the summer of 1883, nesting in all of the highest crags, but never in places accessible to anything not provided with wings. About Silverton, Colorado, a large colony had taken possession of a very high cliff, making their appearance about June 20; during most of the day they could be seen cruising about over the valley at a height of from 1,000 to 2,000 feet, but toward evening or at the approach of a shower they descended frequently to within 100 feet of the ground At such times an occasional shot was to be had at some unwary straggler, and a series of about twenty was taken between June 25 and July 10. Females shot between July 5 and 10 contained ova nearly ready to deposit."

Dr. A. K. Fisher tells me that he saw a number of these birds about the cliffs near Trinidad, in Las Animas County, Colorado, about the middle of July, 1892.

Mr. Robert Ridgway met with it in Nevada, where several hundred were observed one morning hovering over the Carson River, below Fort Churchill, and he also found the remains of one on the Truckee River, near Pyramid Lake.[2]

The Black Swift undoubtedly occurs also in suitable localities in the intervening regions, the mountains of Utah, for instance. Throughout the Sierra Nevadas, the Cascade Mountains, and the coast ranges of California, Oregon, Washington, and British Columbia, it appears to be more generally distributed than in the more eastern portions of its range, and wherever high perpendicular cliffs are found one may reasonably hope to meet with flocks of this large Swift. They are extremely social birds, and are rarely seen singly even during the

[1] Although the West Indian Swift, the type of *Cypseloides niger*, is, according to the American Ornithologists' Union check list, considered identical with our bird, I believe the larger size of the latter, especially the marked difference in the length of the wing and its somewhat paler coloration, is sufficient reason for separating the two, as had been done by Dr. Elliott Coues, and more recently by Mr. Ernest Hartert, in vol. 16, pp. 494, 495, Catalogue of Birds in the British Museum. I find the average wing measurements of the nine West Indian specimens to which I had access to be 6.09 inches, while that of fifteen North American skins is 6 55 inches, and I consider it well entitled to subspecific rank.

[2] History of North American Birds, Vol. II, 1874, p. 430.

breeding season. They usually arrive from their winter homes in Central America during the latter part of April or the beginning of May, and return south again in September. They breed throughout their summer range, and probably only a single brood is raised in a season, as they nest rather late. The only locality where I have observed this species was on the upper Columbia River, opposite Lake Chelan, Washington, in July, 1879. Here quite a colony nested in a high perpendicular cliff on the south side of and about a mile back from the river, and numbers of them flew to and from the valley below, where they were feeding. The day was a cloudy one, and a slow, drizzling rain was falling nearly the entire time I was there; this caused the birds to fly low, and they were easily identified. They evidently had young, and the twitterings of the latter could readily be heard as soon as a bird entered one of the numerous crevices in the cliff above. This was utterly inaccessible, being fully 300 feet high and almost perpendicular; and without suitable ropes to lower one from above it was both useless and impracticable to make an attempt to reach the nests. These were evidently placed well back in the fissures, as nothing bearing a resemblance to one was visible from either above or below. In this locality I believe fresh eggs may be looked for about June 25.

Dr. C. Hart Merriam's exploring parties found the Black Swift fairly common in various localities in Inyo County, California, during June, 1891, and a number of specimens were secured there. Dr. A. K. Fisher, in his Report on the Ornithology of the Death Valley Expedition of 1891, makes the following remarks on this species: "The Black Swift was first observed at Owens Lake, near Keeler, California, where a number were seen flying back and forth over the salt meadows on May 31. On June 2 twenty or more were seen feeding over the same meadows, and five specimens were collected. From the condition of the ovaries of the female secured it was evident that the eggs had been laid. When the flock left the marsh it rose high in the air, and went in the direction of the cliffs in the Inyo Mountains, near Cerro Gordo, where a colony evidently was breeding."[1]

Mr. F. Stephens writes me: "Mr. R. B. Herron has taken this species in the San Bernardino Mountains, California, where they appeared to be breeding. They were flying in behind a waterfall that poured over a perpendicular cliff, and he found one drowned in the basin at the foot of the fall."

Mr. S. F. Rathbun, of Seattle, Washington, informs me that the Black Swift is quite abundant at Lake Samish, three miles east of the north end of Lake Washington. The shores of the lake are well settled, but the birds evidently find Samish a good feeding ground. His earliest record of the arrival of this species there is May 15. Mr. Rollo H. Beck, while hunting near the rocky coast of Monterey County, California, in the summer of 1894, shot a female Black Swift on June 29, containing a nearly developed egg in the oviduct, which he thinks would have been laid next day and would probably have completed a set, as the remaining eggs were very small. The shell was not formed

[1] North American Fauna, No. 7, 1893, p. 54.

yet, and he had no means of measuring it at hand. It resembled the egg of a Chimney Swift in shape, but was somewhat larger.

The food of the Black Swift consists entirely of insects, which are caught on the wing, and its flight is, if possible, still more graceful and rapid than that of the Chimney Swift. It is a rather silent bird, and seldom utters any call notes while on the wing or when feeding. I believe it rarely, if ever, lights on the ground.

As yet there is nothing positively known about the construction of the nest of this species, and the eggs still remain unknown. I am aware that an account of the finding of the supposed nest and eggs has been published in "The Auk" (Vol. V, 1888, pp. 424, 425), but I am quite positive that this is a case of misidentification. I visited the same region in May, 1894, and found the Western Martin, *Progne subis hesperia*, not uncommon in that very locality, and the nest and eggs described as those of the Black Swift are unquestionably referable to this subspecies.

## 63. Chætura pelagica (Linnæus).

CHIMNEY SWIFT.

*Hirundo pelagica* Linnæus, Systema Naturæ, ed. 10, I, 1758, 192.
*Chætura pelasgia* Stephens, General Zoology, XIII, part ii, 1825, 76.
(B 109, C 271, R 351, C 405, U 423.)

Geographical range: Eastern North America; north in the southern portions of the Dominion of Canada to about latitude 50°; in the interior, in northwestern Manitoba to about latitude 52° 30′ and probably still farther; west in the United States to eastern North and South Dakota, eastern Nebraska and Kansas, the Indian Territory, and Texas; south in winter to Jalapa, Vera Cruz, Cozumel Island, and Yucatan, Mexico, and probably still farther.

The breeding range of the Chimney Swift, also known as "Chimney Swallow" and "Chimney Sweep," is coextensive with its distribution in the Dominion of Canada and the United States, it being only a summer visitor, spending the winter in a milder climate. It usually re-enters the United States from the south in the latter part of March or early in April, and its return migration from its more northern breeding grounds begins early in September, while in our Middle States it lingers sometimes well into October. The northernmost record for this species which I have been able to find is Swan Lake, in northwestern Manitoba, where Prof. J. Macoun met with it on July 8, 1881. Its western range appears to be gradually extending, and at present includes about the eastern half of the States of North and South Dakota, Nebraska, Kansas, the Indian Territory, and Texas. It is an eminently social bird, and with the settlement of the country has changed its nesting habits very materially. Formerly the Chimney Swift nested exclusively in hollow tree trunks; now it generally uses chimneys for such purposes, and less often the interior of barns and other outbuildings, attaching its nest to the rough, unplaned boards inside, on the gable end and near the peak of the roof.

In a letter from Dr. William L. Ralph, dated San Mateo, Florida, May 19, 1895, he says: "One of my men brought me the eggs of a Chimney Swift that he said he took from a nest attached to the sides of a well, 4 feet below the surface of the ground. He says they often nest in such places in this vicinity." I consider this as a very unusual nesting site for this species.

The Chimney Swift is both diurnal and crepuscular in its habits, and spends a good deal of time on the wing. In appearance while flying it resembles a bat more than a bird, and its long, attenuated, saber-shaped wings look entirely out of proportion to its short, stubby body. During the mating season the Chimney Swift is particularly active, and small parties may be seen chasing each other throughout the day, and even after the birds are paired they are nearly always seen in parties of three or more, pursuing each other in a good-natured way, uttering at the same time almost continuously their twittering and sharp-sounding call notes of "zig-zig," or "tzig-tzig," rapidly repeated for minutes at a time. Few birds appear to be more sociable and more devoted to each other than the Chimney Swift, and as they consume an immense number of insect pests, and do absolutely no harm, they deserve our fullest protection. Their food consists entirely of insects, such as small beetles, flies, mosquitoes, etc.

Mr. Otto Widmann, of Old Orchard, Missouri, who is well known as one of our most painstaking and reliable ornithologists and a close observer, has kindly furnished me with the following observations on the nesting habits of this species. He writes:

"On the flat roof of my tower I set up a wooden shaft, 18 inches square and 6 feet high, for Swifts. It was ready for occupancy April 18, 1891, and was entered by a Swift the next day. I had the pleasure of seeing one pair build a nest and raise a brood in the shaft in 1891 and again in 1892. My experience, thus restricted to two seasons, is too limited to be of much value, but some points are so much at variance with current statements that I consider them worthy of your notice.

"It is stated that the Swift makes two broods south of Pennsylvania. This is very improbable, since the successful rearing of a brood of Swifts takes not less than two months, which is much longer than the authors who make the statement allow for the process.

"Although the first Swifts appear in our latitude (38° 40′) as early as the beginning of April, and are seen to pair and select a chimney soon after their arrival, the species is too much dependent on continuously warm weather for a regular food supply to begin nest building before the second week in May.

"Nest building, too, takes more time than is generally supposed. Many birds can build in rainy weather; some even choose such times, and one reason for the preference of the early morning hours for building is certainly the circumstance that most of the material used has the necessary pliability only when in a moist state With our Swift it is quite different; he can not proceed with his structure while the atmosphere remains saturated with moisture; his secre-

tion is not a cement, but a glue, which hardens by drying, and our warm days in early summer are generally accompanied by more or less rain.

"It took my Swifts two days to lay the foundation; that is, to besmear the wall and fasten thereto the first few sticks. On the tenth day, when the first egg was laid, the nest was only half done, 2 inches wide, 2½ long, and only one-half inch deep. This was May 24. In the evening the egg was lying under the nest, on the bottom of the shaft. On the next day a second egg was lying on the bottom. Then came a cold, rainy day and no egg was laid. After this they went on building and laying until May 30, when four eggs were in the nest and its dimensions were now 3 by 3½ inches and 1 inch deep. Incubation lasted until June 18, when one egg was hatched in the forenoon and the other three in the afternoon.

"The young remained in the shaft until July 17, after which they were brought back by the parents several nights, and then roosted elsewhere in the neighborhood. During the first week the blind and almost naked young were placed so that the four heads came together in the center of the nest and the anal regions were near to its rim; this arrangement is important for the cleanliness of the home, since the parents do not seem to trouble themselves with removing the excrement. The second week, when the young were fast outgrowing the little home, a different arrangement was necessary; all four heads were now lying flat against the shaft, the anterior part of the body covering and protecting the base of the nest and the posterior part protruding over its rim. At the beginning of the third week I was greatly astonished to find my young Swifts gone; the nest was empty and no Swift to be seen in the shaft. I was still wondering what had become of them when the parent came to feed. Young Swifts are very noisy when fed, and I was glad to hear that they were still inside; all four were huddling side by side, hanging on the wall immediately below the nest and entirely hidden from view above. At the beginning of the fourth week I was still more surprised when, bending my head over the shaft, the youngsters jumped right against my face with a strong, hissing noise, which I believe must be a very effective means of frightening unsuspecting visitors. The fourth week was spent entirely inside the shaft, hanging against its sides, but not higher up than the nest, that is, 3½ feet from the mouth; so the clambering up to the top of the chimney does not seem to be the style any more.

"Last year's experience was essentially the same, with the following variations: May being rainy throughout, they did not begin to build until the first week of June. They attached the nest to the same spot where the nest of the previous year had been washed off, and deposited five eggs, all of which were hatched and all five young brought up. Three left the shaft for the first time on August 1, and the others the next day. The whole process occupied eight weeks and two days, which is six days less than in 1891, in consequence of the more favorable weather while building. The family roosted in the shaft until October 14, when the last left.

"Taking all together, my observations may, in brief, be set forth as follows: In spite of preceding favorable weather, the Swift of St. Louis County, Missouri,

does not begin nest building before the second week of May, and unfavorable weather may delay it until the 1st of June. Only a small quantity of glue is secreted daily, and therefore the completion of the entire structure requires about eighteen days. After two-fifths of the nest is completed (the work of one week) the laying of eggs begins. The process of construction may be retarded by cool weather (lack of food) and by continued rains (softening of glue). The bird can control the laying of eggs; can discontinue for one or more days, if she thinks necessary. Incubation begins before the last egg is laid and lasts eighteen days. The setting parent shields the structure by habitually covering its base with the breast and pressing the head against the wall above. After the young are eight days old they arrange themselves in the same manner. When the sitting bird is disturbed, it at first seeks to frighten the intruder by fluttering and then hides below the nest. The young, when a fortnight old, also hide under the nest, where they can not be seen from above. When three weeks old, they flutter and try to frighten the intruder with a hissing noise, and always remain 2 to 3 feet below the mouth of the chimney (shaft), where they are fed by the parents. The young do not leave the chimney before they are four weeks old. Under the most favorable conditions a late brood can not be brought to a successful end in less than fifty-eight (five eggs) to sixty (six eggs) days, while an early brood (begun the middle of May) may consume from sixty-five to seventy days."

In a subsequent letter, dated August 20, 1894, Mr. Widmann writes me as follows:

"Another season confirmed my former statements in regard to the breeding habits of the Swifts. The pair began building and laying at the regular time; but after the second egg was laid, on May 23, some misfortune happened, and next day the eggs were found on the floor below, and no more were laid until June 10, when laying began anew. Within eight days (June 10 to 17, inclusive) five eggs were laid. On the 14th, after the third egg had been laid, the bird began to set. On the 24th one egg had rolled out, leaving four in the nest. July 1, on the eighteenth day of incubation, the eggs began to hatch, but the last of the four young did not leave the shell until July 3. This bird remained much behind in development, while one of the three others always kept a little in advance. The latter left the shaft for the first time July 26, but the youngest did not get ready to go out until August 7, a difference of eleven days.

"The event of a young Swift leaving the chimney for the first time is made known all over the neighborhood by great excitement and noise. While the species for some weeks before have been quiet and inconspicuous, great activity and noise is suddenly noticed, and numbers are seen chasing through the air. This indicates the event, and it occurred for the first time again on July 17 being the first young raised in the neighborhood. It was particularly noticed that the young Swift is entirely naked when it leaves the shell, and not only the eyes but also the ears are, or appear to be, closed for the first few days. The eyes open by degrees. The best developed specimen of the four had the eyes open for occasional brief

periods on July 11, while two others had them partly open, and the eyes of the smallest remained entirely closed until about the 15th. In the case of the youngest bird, which was a very weak creature at first and could not swallow all the parent put in its throat, I saw minute winged insects crawl out of its mouth. This shows that some of the insects are still alive when brought, and accounts for the peculiar mouth-cleaning motions after feeding. What the misfortune was that befell the first eggs, and why they made a pause of seventeen days before laying again, I do not know. It was not the weather, but it may possibly have been the Red-headed Woodpeckers and Flickers, which did a great deal of drumming and playing about the shaft in those days."

While at Wilmurt, New York, in June, 1892, I found a nest of the Chimney Swift attached to a board in a hayloft, about 2 feet from the peak of the roof. One of the birds was setting on the nest, which was a very small one, while its mate hung against the side of one of the boards, about a foot below and a little to the right of the nest. The male assists in incubation. I saw one of these birds, at a subsequent visit, fly in the loft while I was there, hook himself to the board below the nest, and shortly afterwards he uttered a low twitter; the one on the nest left at once on hearing the note, and flew out, while the newcomer perched on the rim of the nest and rearranged the eggs first before covering them. It changed its position twice before it seemed suited; at least one-half of its length projected outside of the nest, and it is certainly puzzling to know how they manage to rear a family of four or five young in so small a space.

Their semicircular, half-saucer-shaped nest is a most interesting structure, and varies considerably in size and depth, as well as in the manner in which it is attached to the wall or board to which it is glued. Some are exceedingly shallow, barely one-fourth inch in depth, while others are nearly an inch deep, and also much more roomy. An average nest is about 3 inches in outer diameter by 2 inches in width. One of the handsomest specimens I have ever seen was taken by Mr. C. J. Pennock, at Kennett Square, Pennsylvania, on June 16, 1887, and presented to me. This measures $4\frac{1}{2}$ inches in outer diameter by 3 inches in width, and the outer edges, where attached to the wall, are carried completely around on the top, so that it can be hung upon a peg, like a wall pocket; this naturally gave it much more strength, by increasing the surface which is glued to the wall, and lessened the chances of its becoming detached. The nests are entirely built up of small dry twigs, averaging from one-tenth to one-sixteenth inch in diameter and from 1 to $2\frac{1}{2}$ inches in length. One or two somewhat longer twigs project usually from the side, possibly to be used as a perch while the young are being fed.

The amount of saliva used to glue them together also varies greatly in different specimens; in some this is very plainly perceptible, and occasionally forms a thin coating on the inside of the nest; in others hardly a trace can be seen, but nevertheless the twigs hold well together. There is no inner lining of any kind used, the eggs lying on the bare twigs. The latter are gathered on

the wing, the bird breaking them off with its beak while flying past. Before the country was well settled the Chimney Swift built in hollow trees, attaching its nest to the inside walls, and in sparsely settled regions it does so still to some extent; but now, wherever they can avail themselves of an unused chimney, no matter of what material it is constructed, they do so, both for nesting and roosting purposes. It seems to me that they are gradually changing again more and more from the chimney to the inside of barns and outhouses, attaching their nests to the sides of rough, unplaned boards, near the roof. Such sites are more protected from storms, and certainly much cleaner, and the birds appear to have found this out, and act accordingly.

Several pairs frequently nest in company, and it is amusing to see them, after circling over the top of the chimney, suddenly drop down perpendicularly, often from considerable heights, and disappear within. Hundreds are known to roost in the taller chimneys of some abandoned factories in many of our large cities. I have also seen it stated that this species occasionally nests in chimneys which are in use, but no such instance has come under my own observations. Throughout the more northern portions of its range the Chimney Swift rarely commences laying before the second week in June; four or five eggs are generally laid to a set (rarely six) and usually an egg is deposited each day. In chimneys the nests are ordinarily glued to the sides, from 5 to 12 feet below the top.

Few birds are more devoted to their young than the Chimney Swift, and instances have been recorded where the parent was seen to enter chimneys in burning houses, even after the entire roof was a mass of flames, preferring to perish with its offspring rather than to forsake them. I have recently seen in "Forest and Stream" (September 15, 1894, p. 224), another most remarkable proof of affection for its young; want of space prevents me from quoting it entire. The writer states that fully a month after the Chimney Swifts had departed on their southern migration he heard a familiar twitter in the chimney, and taking out the old-fashioned fireboard found a full-grown bird lying upon the hearth. Looking more closely, he discovered that it was fastened by a horsehair wrapped around its leg to the nest, which had fallen down with it. He says: "His anxious mother, who had cast in her lot with him, to remain and to die with him, for the time of insects was about gone, came into the chimney and actually waited beside me while I snipped the strong hair and released him. It was an hour or more before he gained the use of his legs and learned what his mother was teaching him by flying up and down in the chimney, and then they both started on their lonesome flight to the far south." This instance certainly shows a tender side of bird nature, and such instances are far more common than they appear to be, if we could only see them. The young are fed by regurgitation.

The eggs of the Chimney Swift are pure white in color and unspotted; they are cylindrical ovate in shape; the shell is fine grained, rather thin, and moderately glossy.

The average measurement of fifty-six eggs in the United States National Museum collection is 20.09 by 13.22 millimetres, or 0.79 by 0.52 inch. The largest egg of the series measures 21.34 by 13.72 millimetres, or 0.84 by 0.54 inch; the smallest, 17.53 by 13.72 millimetres, or 0.69 by 0.54 inch.

The type specimen, No. 24019 (Pl. 1, Fig. 25), from a set of four eggs, was taken by Mr. J. C. Pennock, near Kennett Square, Pennsylvania, on June 16, 1887, and represents about an average egg of this species.

## 64. Chætura vauxii (Townsend).

VAUX'S SWIFT.

*Cypselus vauxii* Townsend, Journal Academy Natural Sciences, Phila., VIII, 1839, 148.
*Chætura vauxii* De Kay, Zoology of New York, II, 1844, 36.
(B 110, C 272, R 352, C 406, U 424.)

Geographical range: Western North America; chiefly west of the Sierra Nevada and Cascade mountains; north in British Columbia to about latitude 52° and probably farther; east to western Montana and southern Arizona; south to northern Lower California, and in winter through Mexico to Honduras, Central America.

Vaux's, or the "Oregon" Swift, a somewhat smaller and paler-colored bird than the preceding, is principally confined to the Pacific Coast regions, and appears to be much rarer and more sporadically distributed in the interior, east of the Sierra Nevadas, and in the Cascade mountains of California, Oregon, Washington, and British Columbia. The most northern record I have been able to find is one by Mr. Samuel N. Rhoads, published in the "Proceedings of the Academy of Natural Sciences of Philadelphia, 1893" (p. 44), where he reports seeing this species near Lac la Hache, British Columbia, on July 1, 1892. He also met with it at Goldstream, on Vancouver Island, on May 13. It reaches the eastern limits of its range, as far as it at present known, in western Montana, where Mr. C. P. Streator took a specimen at Silver, in Missoula County, on June 25, 1891. Mr. W. E. D. Scott met with it early in October, 1884, on the San Pedro slope of the Santa Catalina Mountains, in southern Arizona, at an altitude of from 3,000 to 4,000 feet.[1] These birds were probably migrating. Mr. F. Stephens observed it daily, and secured a specimen at Olancha, California, on the eastern slopes of the Sierra Nevadas, in the latter part of May, 1891. He believes they were migrating.[2]

The limits of its breeding range are not well defined as yet. Mr. F. Stephens considers it only a migrant in southern California. The only breeding records I have are both from Santa Cruz County, in this State, in about latitude 37°, and it appears reasonable to suppose that it breeds from there northward. But very few nests and eggs of Vaux's Swift have, as far as I am aware, found their way into collections. It possibly breeds also in the more moun-

[1] The Auk, Vol. III, 1886, p. 429.
[2] Birds of the Death Valley Expedition, North American Fauna, No. 7, 1893, p. 55.

tainous parts of northern Lower California. In all of my travels through our Northwestern States I have failed to see this species excepting at Fort Klamath, Oregon, where it was fairly common near Upper Klamath Lake. Dr. James C. Merrill, United States Army, who also met with this species at the same Post, and with whose observations I fully agree, says:

"While the flight of Vaux's Swift is usually higher than that of the eastern species and it is generally more difficult to obtain, yet if their habits are closely studied it will be observed that there are times and places where they may be shot without especial difficulty. The height at which they fly depending on that of the insects upon which they feed, they may be most readily secured soon after sunrise; as the day grows warmer and the insects fly higher, they follow them and are soon out of gunshot range for the rest of the day, unless a change in the weather should occur. Had I made a specialty of collecting these Swifts, I could readily have shot several dozen during the season. As observed at Fort Klamath, this bird is not at all crepuscular. The notes differ somewhat from those of *Chætura pelagica*, though of the same character, and are less frequently uttered."[1]

Vaux's Swift usually reenters the United States from its winter home in Central America about the middle of April, and goes south again during October. Although portions of California where this Swift is known to be a summer resident have been well settled for some time, it does not appear that it has changed its breeding habits to any extent, like the Chimney Swift has in the East, as it still seems to nest entirely in hollow trees, and it is principally due to this reason that so few of the nests and eggs have yet been taken.

Mr. A. W. Anthony, in his paper on "Birds of Washington County, Oregon," writes of Vaux's Swift as follows: "Common summer resident; hunts in flocks of fifteen to twenty. A pair were found nesting in a very large stub late in May; the nest, however, was inaccessible. The birds would circle about, fully 200 feet above the stub, until directly over the opening; then, darting down like a flash, would disappear with a sharp twitter."[2]

A letter received from Mr. Chase Littlejohn, of Redwood City, California, dated August 8, 1893, says: "I took a pair of Swifts in town, birds I had never seen here until last fall, and from their very strong, smoky odor, there can be little doubt that they were living in some chimney, something they are not known to do." Mr. Littlejohn has since then sent me one of the skins for examination, which proved to be Vaux's Swift, as he surmised, and it is possible that this species is just beginning to resort to chimneys for nesting purposes.

Dr. C. T. Cooke writes me from Salem, Oregon, that on May 29, 1891, he discovered one of their roosting and probably also breeding trees in the Willamette Valley—a large, inaccessible, dead, and hollow cottonwood, which also contained a Wood-duck's nest lower down, but likewise inaccessible. The only eggs of Vaux's Swift I have seen were taken in June, 1874, near Santa Cruz,

[1] The Auk, Vol. V, 1888, pp. 256, 257.
[2] The Auk, Vol. III, 1886, pp. 165, 166.

California. The nest is described as composed of small twigs, glued together with the saliva of the bird, and fastened to the side of a burned-out and hollow sycamore tree. It was not lined, and evidently was quite similar to the nest of the Chimney Swift. I have never seen a specimen, and therefore can not give measurements. From three to five eggs are deposited to a set, and only one brood appears to be raised in a season. The eggs resemble those of the Chimney Swifts both in shape and color, but they are considerably smaller.

The only specimens in the United States National Museum collection measure 18.29 by 12.19, 17.78 by 12.70, and 17.53 by 12.45 millimetres, or 0.72 by 0.48, 0.70 by 0.50, and 0.69 by 0.49 inch, respectively.

The type specimen, No. 21005 (Pl. 1, Fig. 26, a single egg), was taken near Santa Cruz, California, in June, 1874, and presented to the collection by Dr. James C. Merrill, United States Army.

## 65. Aëronautes melanoleucus (Baird).

WHITE-THROATED SWIFT.

*Cypselus melanoleucus* Baird, Proceedings Academy Natural Sciences, Phila. June, 1854, 118.

*Aëronautes melanoleucus* Hartert, Catalogue Birds in British Museum, XVI, 1892, 459. (B 107, C 269, R 349, C 403, U 425.)

Geographical range: Mountain regions of the western United States; north to Montana; east to western South Dakota (Black Hills), western Nebraska, and Colorado; south through Arizona, New Mexico, western Texas, and Lower California to Guatemala, Central America.

The range of the White-throated or "Rock" Swift does not appear to extend nearly as far north in the mountains of the Pacific Coast districts as it does in the Rocky Mountain region, where it is generally distributed, throughout suitable localities, from southern Arizona and New Mexico northward through Colorado and Wyoming to Montana, which, as far as known, marks the northern limits of its range. Here Mr. R. S. Williams found this species breeding in small numbers in holes in a limestone cliff on Belt River, about the middle of July, 1881. He says: "A small opening in the rock, which a bird of this species was seen to enter and reappear from several times, I approached near enough to hear a vigorous twittering at each visit of the parent bird, from which I presume the young were well advanced."[1]

On the Pacific coast in California I have not been able to trace it north of Alameda, Contra Costa, and Mariposa counties, in about latitude 38°, and somewhat farther north in Nevada, where Mr. Robert Ridgway found this species extremely numerous in the Ruby Mountains, about the high limestone cliffs, as well as in the East Humboldt range, in about latitude 40°, and less abundantly in the Wasatch Mountains in Utah. I have been unable to find a single record of its capture in either Oregon or Washington, and this is the more

[1] Bulletin of the Nuttall Ornithological Club, vol. 7, 1882, p. 123.

strange as these States abound in suitable cliffs, and the White-throated Swift appears to be the hardiest member of this family found in the United States and winters to some extent within our borders. Throughout the more northern portions of its range it is only a summer visitor, but in southern California and Arizona it is found throughout the year. Mr. F. Stephens writes me:

"The White-throated Swift is a rather common resident in southern California. In winter it is somewhat less common, and disappears in stormy weather. In the Colorado Desert, however, it is usually common all winter. It breeds in small colonies in cliffs, usually in the lower parts of the mountains, during May and June. On March 28, 1890, at Boregas Spring, on the border of the Colorado Desert, I saw several White-throated Swifts flying in and out of crevices of a sandstone cliff. I succeeded in climbing to one of these crevices, and chopped away a part of the soft sandstone or indurated clay and found two birds, evidently a pair, in the extreme back end of a narrow crevice. They were sitting on a small bunch of short twigs and weed stems, glued together into a nearly solid mass, evidently an old nest. The female, on dissection, proved to be not nearly ready for laying, as the ovaries were in the normal winter condition."

There are numerous records of the occurrence of the White-throated Swift in Arizona, New Mexico, and Colorado. I have seen hundreds of these birds near Tucson, Arizona, some throughout nearly every month in the year, and they evidently breed in the vicinity, in the numerous cliffs in the Catalina and Rincon mountains. Mr. W. G. Smith and Mr. A. W. Anthony met with it in Colorado, where it was quite common in suitable localities. The latter writes me: "A few nest in the high cliffs above Silverton, Colorado, with *Cypseloides niger*. A female was shot by Mr. F. M. Drew on June 20, at an elevation of about 13,000 feet, and upon skinning her an egg was found ready for extrusion, but it was unfortunately broken. A flock of these Swifts were apparently trying to winter at Hatchita, New Mexico, as I saw them constantly as late as December 15. At San Diego, California, they winter in abundance, and are frequently seen feeding along the beach north of Point Loma. A colony was also found by me nesting on Coronado Island on May 20, but the nests were inaccessible; they were placed behind loose slabs of rock that had become partly detached from the face of the cliff, and from 20 to 30 feet above the water level. At Guadalupe Island this Swift was very abundant; the ragged, precipitous sides of the island, composed of lava and perforated with thousands of holes and crevices, furnish an abundance of nesting sites, and it is quite probable that this species is resident there throughout the year. At the time of my visit, in May, I found White-throated Swifts everywhere, from the top of the island, at 4,000 feet elevation, to the beach, and birds were constantly seen to enter holes in the crags; but in every case the nests were as inaccessible as it is possible for a nest to be. On May 18 a Swift was seen to enter a hole in the face of a bluff, within 8 feet of its base; even this proved to be as safe as any of the rest, as the nest was found to be out of sight and several feet back, in a narrow crack in the lava. I

also found it nesting at San Fernando, Lower California, nearly at sea level, and on top of San Pedro Martir, at 10,000 feet elevation, in May."

Messrs. Vernon Bailey and J. A. Loring, while collecting for the United States Department of Agriculture, met with the White-throated Swift in the Wind River and Sweet Water mountains, Wyoming, during August and September, 1893, and Mr. J. B. White has taken it at Harrison, Nebraska, which marks the eastern limits of its known range.

Its general habits, food, etc., do not differ much from those of the other members of this family found within the United States, and, like them, it usually flies high during clear, sunny weather, while on cloudy days, as well as in the early mornings and again about sundown, it hunts lower down, and is then more readily obtained. In its mode of nidification it differs from both the Chimney and Vaux's Swift, while the Black Swift probably nests in a similar manner. Mr. F. Stephens's description of its nesting habits are fully confirmed by more recent observations made by Mr. W. B. Judson in Los Angeles County, California, who found a nest of this species during the summer of 1894. He writes me: "It was situated about 80 feet from the top of a large cliff and about 125 feet from the ground, in a cave about 7 feet high, 10 feet wide, and extending some 7 feet in the face of the cliff. The nest was placed in a small hole in the roof of the cave, almost too small to get my hand in without enlarging it, and extended about a foot up in the rock, and then there was a small cleft in which it was placed. It was so firmly glued to the rock that it could not be pulled off without tearing it to pieces. The materials of which it was constructed felt soft and spongy; there were apparently no sticks or twigs in it, and it was lined with a few feathers." White-throated Swifts were seen to enter this cave in May, but Mr. Judson did not visit the locality again until late in summer, by which time the birds had reared their young and left the vicinity.

Since the above was written, Mr. Judson has kindly obtained this nest for me, and I am able, therefore, to give a fuller description, as well as measurements of it. Evidently it has been in use during more than one season, as the vegetable matter composing the base of the nest is quite disintegrated; while a number of good-sized feathers, including some of the California and Turkey Vulture, Red-shafted Flicker, and other species, which are mixed throughout the walls of the structure, are in a somewhat better state of preservation. It measures 5 inches in outer diameter by 2 inches in depth. The inner cup is shallow and appears not to have been over three-fourths of an inch deep. Mixed throughout the nesting material are small pieces of the wing coverts of beetles. The skeleton of a young Swift was also found in the nest. The inner lining consists of fine bark fiber and a few feathers, and apparently no twigs enter into its composition; the shafts of the feathers used, evidently took the place of the ordinary small twigs and weed stems. The call notes of this species are rather louder and shriller than those of the Chimney Swift, but otherwise resemble the rattling twitter of the latter. In speaking of their song

Dr. Fisher says: "The males uttered at short intervals a series of notes which, when a number joined in the performance, produced a not unpleasant impression."

The eggs of this species still remain among the special desiderata in oölogical collections. I have never seen any, and there are none in the United States National Museum. Mr. Walter E. Bryant gives the following description of them: "More than a dozen years ago an imperfect set of five fresh, unblown eggs of the White-throated Swift were presented to me by a young man in Contra Costa County, California. They were taken from a nest in a crevice in the back of a tunnel-shaped cave in the side of a cliff, about 20 feet above the base. In color the eggs are pure white, narrowly elliptical in form, but rather smaller at one end. They measured 0.87 by 0.53, 0.88 by 0.53, 0.88 by 0.52, and 0.86 by 0.50 inch (or 22.10 by 13.46, 22.35 by 13.46, 22.35 by 13.21, and 21.84 by 12.70 millimetres); the fifth was too much damaged to measure accurately. The eggs were collected on June 6, 1876."[1]

From four to five eggs appear to be laid to a set, and probably only a single brood is reared in a season.

## Family TROCHILIDÆ. Hummingbirds.

### 66. Eugenes fulgens (Swainson).

RIVOLI HUMMINGBIRD.

*Trochilus fulgens* Swainson, Philosophical Magazine, 1827, 441.
*Eugenes fulgens* Gould, Monograph of the Trochilidæ, Part XII, 1856, Pl. 7, and Vol. II, 1861, Pl. 59.

(B —, C 274 *bis*, R 334, C 408, U 426.)

Geographical range: Mountains of southeastern Arizona, southwestern New Mexico, and over the table-lands of Mexico; south to Nicaragua, Central America.

The Rivoli Hummingbird, also known as "Refulgent Hummingbird," one of the largest as well as one of the handsomest members of this family found within the limits of the United States, is a moderately common summer resident in suitable localities, but has as yet been obtained only in the mountains near the Mexican border, in southeastern Arizona, and in the extreme southwestern corner of New Mexico, in the San Luis range. It was first added to our fauna by Mr. H. W. Henshaw, who took a single specimen in the vicinity of Camp Grant, Arizona, on September 24, 1873; he also met with others in the following year. Since then it has been ascertained to be a summer resident throughout all the higher pine-clad mountains in southeastern Arizona. Mr. F. Stephens met with it in the Santa Rita and Santa Catalina mountains. Dr. A. K. Fisher, Messrs. F. H. Fowler, W. W. Price, and others took specimens in the Chiricahua and Huachuca ranges, while Dr. Edgar A. Mearns obtained it in the

[1] The Nidiologist, Vol. II, Sept. 1894, pp. 7, 8.

San Luis Mountains, New Mexico. I believe Mr. Henshaw's record from near Fort Grant still remains the most northern one, and it is not likely that it will be found much beyond latitude 33°. Its range seems to be restricted to the mountain regions between altitudes of from 5,000 to 10,000 feet, and it breeds throughout its summer range in the United States.

Dr. A. K. Fisher has kindly furnished me with the following notes on this handsome Hummingbird:

"The Rivoli Hummer was not met with by us in the Chiricahua Mountains until we made camp in the upper part of Ruckers Canyon, among the yellow pines (*Pinus ponderosa*). On the morning of June 5, 1894, an adult male dashed through the camp, paused a moment over a flower spike of a scarlet *Pentstemon*, and then disappeared up the canyon as rapidly as it had come. No more were seen until we reached the high mountains at Fly Park. On the evening of June 7, Mr. Fred. H. Fowler killed an adult male, and on the following day the writer secured a female and two males, and subsequently others were taken. They were usually found in the more open parts of the forest where fire had killed a portion of the evergreens, and a deciduous undergrowth of aspens and shrubs thrived about the cool springs and little rivulets. A boreal honeysuckle (*Lonicera involucrata*) was abundant and just coming into bloom. All the Hummers in the vicinity, the Rivoli Hummer among them, delighted to glean from the flowers and to sit half concealed among the large leaves of this shrub. If the large Hummer was startled from one of the clumps, it would fly to the lower branches of a neighboring evergreen and settle on a dead twig and remain motionless. They were not very shy and could be approached within 20 feet.

"It is the opinion of the writer that all the birds seen were migrants, for after the first few days the species became quite rare, and during the three or four days subsequent to June 15 none were seen. Moreover, the testes of all the males secured were still undeveloped. It is probable that they spent a few days after their migration in feeding, and then separated and retired to the more secluded forest to hunt up nesting places. No note was heard."

They are said to be especially fond of hovering about the blossoms of the mescal (*Agave americana*); these are generally infested by numerous small insects, on which they feed, and, like all our Hummingbirds, they are exceedingly greedy and quarrelsome, chasing each other constantly from one flower stalk to another.

Comparatively little is still known about the breeding habits of this species. Mr. O. C. Poling published an account of its supposed nest and eggs in "The Auk" (Vol. VII, 1890, pp. 402 and 403), but the measurements of the latter, as given by him, show clearly that they can not belong to this bird, and are much more likely to be those of one of the smaller Hummers breeding in the same locality. The Rivoli Hummer is fully as large as the succeeding species, whose eggs are known, and these are considerably larger than the measurements given by Mr. Poling, and there are absolutely identified eggs of the Ruby-throated Hummingbird now in the United States National Museum collection

which are larger than the supposed eggs of this species. The great difference in the size of these two birds proves conclusively that there must be a mistake either in identification or in the measurements of the eggs as described by him.

I am indebted to Mr. W. W. Price for a couple of nests of this species and a broken egg, which, however, is so badly crushed that it is impossible to restore it and give accurate measurements. Both of these nests were taken in the Huachuca Mountains, in southern Arizona. The best preserved one of the two measures $2\frac{1}{4}$ inches in outer diameter by 2 inches in depth; its inner diameter is $1\frac{1}{2}$ by $1\frac{1}{4}$ inches in depth. It is composed of soft, silky plant fibers, and is thickly coated exteriorly with small pieces of lichen, and lined with fine down and one or two soft, fluffy feathers, apparently those of a species of Titmouse. It resembles the nest of the Ruby-throated Hummingbird very closely in its general make up, but is naturally considerably larger. It was found by Mr. L. Miller on June 22, 1894, at an elevation of about 7,000 feet, saddled on a walnut branch about 10 feet from the ground, and contained one young nearly able to fly. The other, which is not quite so well preserved, was found by Mr. Price in the same mountains on June 4, 1893, placed on a slender branch of a maple over running water, in a deep, narrow canyon, at about 6,000 feet elevation. The male was seen a short distance away from the nest; the female hovered about while the branch was being cut off, and was secured. The single fresh egg the nest contained was accidentally broken.

Mr. Price writes me: "*Eugenes fulgens* is found all through the pine regions of southern Arizona. It was not rare in the Huachuca and Chiricahua mountains, but I have never seen it below 6,500 feet elevation, and I have found it above 9,500 feet. During the flowering season it feeds extensively in the flowers of the *Agave parryi* in the Huachuca Mountains. In the Chiricahuas I have found it early in the mornings in open glades, feeding on the flowers of an iris. It delights in open woods more than in damp ones, as is the habit of the Blue-throat, *Cœligena clemenciæ*."

There are no eggs of the Rivoli Hummingbird in the Unites States National Museum collection.

## 67. Cœligena clemenciæ Lesson

BLUE-THROATED HUMMINGBIRD.

*Ornisyma clemenciæ* Lesson, Oiseaux Mouches, 1829, 216, Pl. 80.
*Cœligena clemenciæ* Lesson, Index General et Synoptique des Oiseaux du Genre Trochilus, 1832, p. XVIII.

(B —, C —, R —, C —, U 427.)

Geographical range: Mountains of southeastern Arizona, southwestern New Mexico, and the table-lands of Mexico; south to Guerrero and Oaxaca.

The geographical range of the Blue-throated Hummingbird, also sometimes called "Blue-throated Casique," a slightly larger species than the preceding, is very similar, and, like the Rivoli Hummer, it is only a summer resident in the

United States, and breeds wherever found. As far as known it arrives within our borders early in May, and returns south again about the beginning of October. This large and rather dull-colored Hummer was first added to our fauna by Mr. F. Stephens, who secured an adult male in the Santa Catalina Mountains on May 14, 1884. Since then it has been taken by Mr. E. W. Nelson in the Santa Rita Mountains; by Dr. A. K. Fisher, Messrs. W. W. Price, F. H. Fowler, and others, in both the Chiricahua and Huachuca mountains, in southeastern Arizona, and by Dr. Edgar A. Mearns, United States Army, in the San Luis Mountains, in southwestern New Mexico. Like the preceding, it is a mountain-loving species, frequenting similar regions; and, judging from the number of specimens that have been taken within our borders, it appears to be more common than the Rivoli Hummer.

Dr. A. K. Fisher has kindly furnished me with the following notes:

"The Blue-throated Hummingbird was common in the higher Chiricahua Mountains, where it was observed at Fly Park during the early part of June, 1894. Like the Rivoli Hummer, it was very partial to the flowers of the shrubby honeysuckle (*Lonicera involucrata*), among which six were secured June 8 and three on June 10. It is probable the flowers attract large numbers of insects, which in their turn attract the birds, for the gullets of the Hummers secured were filled with them. On several occasions the male was heard to utter a simple little song, consisting of three or four syllables, which were repeated at short intervals. While delivering this song the bird sat upright, with head more or less thrown back. No signs of mating were observed, and the genitalia of the specimens secured were undeveloped. From June 10 to June 15 the species became gradually rarer, and it is probable they had dispersed among the wilder parts of the mountains, preparatory to nesting."

I am also indebted to Mr. E. W. Nelson for the little we know relating to the nesting habits of the Blue-throated Hummingbird. He writes me as follows:

"*Cœligena clemenciæ* is a sparingly distributed summer resident of all the mountain regions of south central Mexico, between 7,500 and 12,000 feet. They are rather quiet birds, often found perched on the tips of large maguey leaves In the forests of pines of the higher slopes they are not often seen except as they dash by among the trees. On the 9th of September, 1893, a nest containing two eggs was found at an altitude of 11,500 feet on the north slope of the volcano of Toluca, in the State of Mexico. At this time the nights had already become quite frosty here. The nest was built in the fork of a small shrub, growing out of the face of a cliff about 30 feet above its base, on the side of a canyon, in the pine and fir forest. The nest was discovered by seeing the parent approach its vicinity. She flew quietly close up to the nest, and then, turning so that she faced out from the cliff and away from the nest, she moved backward several inches and settled lightly on the eggs. She was easily alarmed, darting away through the forest, and was not seen again. The nest was nearly inaccessible, and one egg was thrown out and broken in securing it."

This nest, No. 26332, United States National Museum collection, now before me, is a handsome and rather bulky structure, which is apparently composed

entirely of fine mosses, the whole evenly quilted together into a smooth, homogeneous mass, and bound firmly together with silk from cocoons and spiders' webs. It is saddled in a tripronged fork of a small twig, the three stems being incorporated in the walls of the nest, holding it firmly in position, the main stem being only one-twelfth of an inch in diameter. It measures 2¾ inches in outer diameter by 3 inches in depth; the inner cup is 1¼ inches in diameter by three-fourths of an inch deep. The walls of the nest are three-fourths of an inch thick, and the inner cup appears very small for the large size of the nest. It looks like a warm and cozy structure, and it needs to be so. As the eggs were only slightly incubated when found, the young would probably have hatched by September 20, and would scarcely have been large enough to leave the nest before October 12, by which time one might reasonably look for snowstorms at such an altitude. There is but very little inner lining, not enough to hide the moss, which looks to me like the down from willow catkins. Two eggs are laid to a set, and probably two broods are raised in a season.

The single egg before me is elliptical oval in shape, dull white in color. The shell is close-grained and shows no luster. It measures 16.26 by 9.91 millimetres, or 0.64 by 0.39 inch. As there is but a trifling difference in the size of most of our Hummingbirds' eggs, and apparently none in their shape and color, I have, therefore, only figured the egg of a single species.

The type specimen, No. 26332 (not figured), was taken by Mr. E. W. Nelson on September 9, 1893, as already described.

## 68. Trochilus colubris Linnæus.

RUBY-THROATED HUMMINGBIRD.

*Trochilus colubris* Linnæus, Systema Naturæ, ed. 10, I, 1758, 120.
(B 101, C 275, R 335, C 409, U 428.)

Geographical range: Eastern North America; north in the more southern parts of the Dominion of Canada to about latitude 52°, in the interior in the Northwest Territory to about latitude 57° and probably still farther; west in the United States to eastern North and South Dakota, eastern Nebraska and Kansas, the Indian Territory and Texas; south in winter to the West India Islands and through eastern Mexico to Veragua, Central America. Casually to Labrador.

The Ruby-throated or Northern Hummingbird, the sole representative of this family in eastern North America, is only a summer visitor in the Dominion of Canada and throughout the greater part of its range in the United States, excepting the southern portions of the Florida peninsula, where it winters to some extent. By far the greater number of these birds, however, migrate farther south, spending the winter in some of the West India Islands, while others pass through eastern Mexico into Central America, as far south as Veragua. It usually arrives along our southern border in the latter part of March, and moves leisurely northward, rarely reaching the more northern States before the middle of May, or about the time the early and hardier flowers begin to

blossom, and it usually goes south again about the latter part of September, the males preceding the females, I believe, in both migrations. Its breeding range is coextensive with its geographical distribution. Along the Atlantic coast it has been met with by Mr. Lucien M. Turner as far north as Davis Inlet, Labrador, in latitude 55° 37′, but this may have been only a casual straggler, as few birds of this species appear to breed north of latitude 52°. In the interior, in the so-called fur countries, it reaches farther north, however. Sir John Richardson met it here up to the fifty-seventh parallel, which appears to be the northernmost known limits of its range; but it is quite possible that it reaches still higher latitudes. None of the numerous gentlemen connected with the Hudson Bay Company, interested in ornithological investigations in the far north, appear to have met with it in the lower Mackenzie basin or along the shores of Great Slave Lake. Westward its range extends well into the eastern borders of the Great Plains; it is a fairly common summer resident here in suitable localities, in eastern Saskatchewan, and in Manitoba, as well as throughout the eastern parts of North and South Dakota, Nebraska, Kansas, the Indian Territory, and about the eastern half of Texas. In many parts of Florida it seems to be a rather rare breeder, but north of this State it is mostly a common summer resident.

The Ruby-throated Hummingbird prefers rather open and cultivated country, interspersed here and there with mixed or deciduous woods overrun with flowering masses of vines and creepers, extensive orchards, etc., and it is not at all adverse to taking up its home in flower gardens, in close proximity to man. Its flight is extremely swift, and the rapid motions of its wings in passing back and forth from one cluster of flowers to another causes a humming or buzzing sound, from which the numerous members of this family derive their name of Hummingbirds. Notwithstanding the very small size of most of our Hummers, they are all extremely pugnacious, especially the males, and are constantly quarreling and chasing each other, as well as other birds, some of which are many times larger than themselves. Mr. Manly Hardy writes me that he once saw a male Ruby-throat chasing a Robin out of his garden and following it up until lost to sight.

There appears to be considerable difference of opinion among various observers regarding the nature of their food, some contending that this consists principally of nectar sipped from flowers, as well as the sweet sap of certain trees, to which they help themselves at the drinking places of the Yellow-bellied Sapsucker, *Sphyrapicus varius*, while others, myself included, believe that they subsist mainly on minute insects and small spiders, the latter forming quite an important article of food with them. Mr. Edwin H. Eames, of Bridgeport, Connecticut, mentions finding sixteen young spiders of uniform size in the throat of a young Hummingbird which was about two days old.[1]

[1] The Auk, Vol. VII, 1890, pp. 286–288. I also refer the reader to Mr. Frederick A. Lucas's interesting paper in the same periodical (Vol. X, 1893, pp. 311–315), and to another by the same author, "On the structure of the tongue in Hummingbirds," in the "Proceedings of the United States National Museum" (Vol. XIV, 1891, pp. 169–172), all of which bear on this subject, but want of space prevents me from quoting them.

That our Hummingbirds live to some extent on the sap of certain trees is undoubtedly true, but that they could exist for any length of time on such food alone is very questionable, to say the least. They are particularly fond of the sap of the sugar maple, and only slightly less so of that of different species of oak, birch, poplar, sycamore, and willow, as well as of the nectar secreted in the flowers of the lilac, honeysuckle, jasmine, begonia, horse chestnut, and many others

Mr. E. A. McIlhenny writes me from Avery, Louisiana: "It is quite a common occurrence here for the Ruby-throated Hummer to get drunk on the nectar of the flowers of the china tree (*Melia azedarach*). It sometimes imbibes so much of the nectar that it becomes stupefied and falls from the tree, when it can be readily taken in the hand, and offers no resistance. I have also taken them by putting a little brandy and honey in honeysuckle and jasmine blossoms; they readily take this, and become so intoxicated that they are easily caught."

While stationed at the former cavalry depot at St. Louis, Missouri, in 1873–'74, I occupied a set of quarters that were completely overrun with large trumpet vines (*Tecoma radicans*), and when these were in bloom the place fairly swarmed with Ruby-throats. They were exceedingly inquisitive, and often poised themselves before an open window and looked in my rooms full of curiosity, their bright little eyes sparkling like black beads. I have caught several, while busily engaged sipping nectar in these large, showy flowers, by simply placing my hand over them, and while so imprisoned they never moved, and feigned death, but as soon as I opened my hand they were off like a flash. They seem to be especially partial to anything red.

Mr. Manly Hardy writes: "I was once camping on one of the many islands along the coast of Maine during a dense fog, which had held us prisoners for several days, as it was so thick that we could not find our way. We had been living on lobsters, and lots of their red shells lay near the fire in front of our tent, when suddenly a Hummer came out of the fog and darted down at the shells, moving from one to another, seemingly loath to leave them."

Mr. W. N. Clute, of Binghamton, New York, writes: "The swamp thistle (*Cirsium muticum*), which blooms in August, seems to have great attractions for the Ruby-throated Hummingbirds. I have seen more than a hundred birds about these plants in the course of an hour. Since it has been stated that the bee gets pollen but not honey from the thistle, it would appear that these birds visit these flowers for insects. There is scarcely a flower that contains so many minute insects as a thistle head. Examine one with a lens and it will be found to contain many insects that can hardly be seen with the unaided eye, and if the Ruby-throat eats insects at all, these are the ones it would take; and because the larger ones remained the observer might conclude that none were eaten. The jewel weed (*Impatiens*) also receives much of their attention, and nowhere do I find these birds so abundant as about these two flowers."

I could quote considerable more testimony showing that the Hummingbirds live to a great extent on minute spiders and insects, but consider it unnecessary. Hummingbirds are readily tamed and make interesting pets, but do not seem to

live long in captivity. Something seems to be lacking, probably the required quantity of insects which they are able to obtain in a wild state, and sirup alone does not appear to enable them to survive such changed conditions for any length of time. All of our Hummingbirds are very fond of bathing, and I have seen one fly repeatedly through the spray of a fountain in one of the numerous parks in Washington, District of Columbia.

Mr. Otto Widmann, of Old Orchard, Missouri, has kindly furnished me with the following notes on this species:

"While in the St. Francis region, Missouri, I was not a little surprised to meet, on the forenoon of May 10, a great number of Ruby-throats in the garb of the female, but with beautiful red throats, in shape exactly like the patch of the male, but the color a plain solferino, without any metallic or golden hue. At first I did not know what to make of it, until I found out that the pollen of *Æsculus pavia*, the red shrub buckeye, is of the identical color and stains the fingers with solferino at the touch. These Ruby-throats were a wandering army of females; among the large number of birds present only a few (one or two, I think) males were seen, and they were probably summer sojourners in these woods. Next day I visited the same forest again at the same hour, but all the female Hummers were gone.

"The first Hummers appear in St. Louis County about the last week in April, but in southeast Missouri (Pemiscot County) I found them already present on April 11, 1893. Male Hummers do not become numerous in St. Louis County before May 5, and females about May 12. Fresh eggs are to be looked for about the 1st of June. Southward migration is well under way by the middle of September, when Hummers are very plentiful. After the 1st of October they are less frequently seen, but the last ones do not leave us before October 11 or 12. Migration in this species has much in common with that of the Swift, from which fact I conclude that their insect food may be somewhat similar, and that both species may feed on nearly related insects. A peculiarity of the Ruby-throat, which I have only once seen mentioned in print, is the pendulum play of the male Hummer. In time it coincides with the period of sexual excitement; it begins here about May 12, with the arrival of the bulk of the females, and lasts until incubation has commenced. In this play the bird is swinging to and fro, as if suspended from a fixed point; it describes one-fourth of a circle, and travels about a rod. This pendulum movement is continued about a dozen times, the bird emitting chirps all the time."

Shortly after their arrival in the spring they are continually chasing each other about; considerable of this is undoubtedly done in play, but occasionally they act like perfect little furies, and try to injure each other as much as possible. At such times they utter rather shrill, squealing sounds, like "chic-we-we-a," which are frequently and rapidly repeated; at other times they utter low, chippering sounds that can only be heard when close by, intermixed now and then with a somewhat louder chirp. After one has driven its rival away it generally returns to one of its favorite perches, some little dry twig of a shrub or tree, from where it commands a good outlook, and commences at once to

rearrange and smooth out its plumage, usually beginning with the primaries, which are dexterously passed through its bill by raising and extending the wing on a level with the head. It is rarely seen entirely at rest for any length of time, and, when not busy preening its feathers, it darts about from one place to another. Although such a small, tiny creature, it is full of energy, and never seems to tire. During the mating season the male is very devoted to his mate, following her constantly about, and fiercely attacks any rival that may approach too near her.

In our Southern States nidification begins usually about the first week in May, occasionally a little earlier or later, according to the season, and correspondingly later in the more northern portions of its range. A suitable nesting site having been selected (and this appears to be an easy task), preparations for building are soon begun. During this time the male may frequently be noticed indulging in the pendulum play already described, and both sexes will frequently dart straight up into the air for some 50 feet, and as quickly drop down again in the vicinity of the chosen nesting site. The nest is generally saddled on a horizontal or a somewhat drooping limb of a tree, about half an inch or a little more in thickness, or it may be placed at the junction of a little fork where one side of the nest is supported by one of the branches, and less often in bushes or vines, varying from 6 to 50 feet high, usually from 10 to 20 feet from the ground. Its favorite breeding resorts are second-growth timber along river bluffs, hillsides, the borders of forests, in shade trees along country roads, orchards, gardens, etc. I believe the different species of oak, where they are found, are preferred for nesting sites to all other trees, while hickory, tulip, poplar, maple, horse-chestnut, beech, sycamore, dogwood, black gum, buckeye, birch, apple, pear, orange, pine, red cedar, and other trees, rose bushes, and creeping vines are also more or less used. In the Adirondacks, in New York, I believe birch trees are the favorites. I have seen one of its nests saddled on the top of and between two old pine cones, on a slender, dry limb, which I consider a rather unusual nesting site for this species.

The nest of our Ruby-throated Hummingbird is one of the most exquisite pieces of bird architecture to be found anywhere. The circular foundation is composed of bits of lichens, mixed with fine vegetable fibers, which are apparently firmly glued to the twig on which the nest is saddled, presumably with saliva secreted by the bird for this purpose, and the structure is built upon this, the inner portions of it being composed of soft, downy plant fibers, such as the silky down of different species of willows and poplars, that found on the young and unexpanded leaves of the oaks and various kinds of ferns (*Filices*), especially that from the young stalks of the common brake (*Pteris aquilina*), the silky down of the milkweed (*Asclepias*), and similar materials from other sources. After these have been well worked together in a sort of vegetable felt, the outer walls of the nest are profusely covered with a coating of bits of lichens obtained from the trunks and limbs of trees in the vicinity, and then are firmly fastened in place with spider webs, giving the nest the appearance of a small, lichen-covered knot, which for this reason is rather difficult to detect. In nearly every

instance the nest is placed so that its contents are protected from above by the leaves of the tree or a limb directly over it, and it is rare to find one in a perfectly open and unsheltered situation. The location of the beautiful little structure certainly shows considerable intelligence on the part of the builder.

The nests vary somewhat in size and bulk, according to the thickness of the limb or twig on which they are saddled. An average-sized specimen measures about 1½ inches in outer diameter by 1¼ inches in depth. The inner cup is about an inch in width by five-eighths of an inch in depth. I believe that the female performs about all the labor required in the construction of the nest, the male simply following her around while she is gathering the necessary materials and protecting her, although he may occasionally assist to some extent. As nearly as I can judge, it takes about ten days to complete the structure.

Mr. H. W. Flint, of New Haven, Connecticut, sends me the following interesting note on this subject:

"On May 30, 1890, I noticed an interesting fact in connection with this species. I was watching a Downy Woodpecker excavating a home in the top of a lofty maple on the edge of heavy timber, when suddenly a male Hummer, closely followed by his mate, darted toward the trunk of a large oak, at the height of at least 35 feet from the ground, and were immediately attacked by some kind of beetle, which attempted to drive them from the tree. The birds would, after an apparent struggle with the beetle, cling to the trunk of the tree a moment, pull off a bit of lichen, and then suddenly leave the spot like a flash. I watched this pair over two hours before I succeeded in locating the nest, which was at least 10 rods distant, and each time they returned to the tree the beetle met them and fought them off, frequently driving them from the trunk after they had succeeded in alighting. The male showed great anger, and his sharp, rapid chirping was almost incessant while in the vicinity of the tree. The beetle did not attempt to follow the birds, but tried to prevent their alighting upon or approaching the tree. I was very much interested, and can not now understand what was the cause of the antagonism existing between them. The nest, which I afterwards secured, was beautifully decorated, and the eggs somewhat incubated, usually the case where the nest is well covered, as much of the exterior decoration is done after the eggs are laid, and even after the young are hatched."

In the Southern States fresh eggs may be looked for during the first two weeks in May, in the vicinity of Washington, District of Columbia, about June 10, and in New England and our Northern States in the latter part of this month or during the first half of July. Two eggs are laid to a set, one every other day, and these are frequently deposited before the nest is more than half completed, the female finishing it gradually after incubation has commenced, and sometimes adding additional lichens on the outside, even after the young have been hatched. Incubation lasts about fourteen days, and the female not only attends to this duty alone, but also appears to care for the young exclusively, which are large enough to leave the nest in about sixteen days. They are born blind, and do not open their eyes until they are about a week old. As soon as incubation commences the male appears to lose all interest in his spouse for the time being,

and lets her attend to her family duties alone, leading an easy, careless life in the meantime. Although I have watched several nests of Hummingbirds containing young for hours at a time, I have never yet seen a male feeding them. They grow amazingly fast, and when about ten days old they are about as large as the parents. Their bills, however, grow proportionally much slower than their bodies. The young are fed by regurgitation. I have satisfied myself fully on this point, and have seen the female insert her bill almost for its full length in the throat of the nestlings, and watched her, with the aid of a strong glass, doing so repeatedly. When not in search of food she broods the young or sits on the rim of the nest preening her feathers. I believe two broods are frequently raised in a season, occasionally three perhaps, as fresh eggs have been found as late as August 7. An old nest is sometimes occupied for several seasons and remodeled each year; and should the nest and eggs be taken or destroyed, a second and occasionally even a third and fourth attempt at nesting is made within about a week, and sometimes these subsequent nests are built in the same tree again, or in others close by. The birds become very much attached to a locality once chosen for a home, and will return to it from year to year, not infrequently building a new nest on the top of the last year's one, or alongside of it. The female is very devoted to her young, and will occasionally resent an intruder's presence by darting at his face.

The eggs of the Ruby-throated Hummingbird are pure white in color; the shell is close-grained, rather frail, and without luster. They are mostly elliptical oval in shape, but occasionally a specimen approaches an elliptical ovate, one end being somewhat smaller than the other.

The average measurement of twenty-nine specimens in the United States National Museum collection is 12.95 by 8.50 millimetres, or about 0.51 by 0.33 inch. The largest egg of this series measures 14.48 by 9.14 millimetres, or 0.57 by 0.36 inch; the smallest, 12.19 by 8.38 millimetres, or 0.48 by 0.33 inch.

The type specimen, No. 26914 (Pl. 1, Fig. 27), from a set of two eggs, was taken by Dr. William L. Ralph, near Holland Patent, New York, on June 21, 1888, and represents an average egg of this species.

## 69. Trochilus alexandri Bourcier and Mulsant.

BLACK-CHINNED HUMMINGBIRD.

*Trochilus alexandri* Bourcier and Mulsant, Annales Societé d'Agriculture de Lyon, IX, 1846, 330.

(B 102, C 276, R 336, C 410, U 429.)

Geographical range: Western North America; from the Pacific coast to the Rocky Mountains; north to southern British Columbia, on both sides of the Cascades and southern Alberta ?; east to western Montana, western Colorado, New Mexico, and western Texas; south through California and Arizona into northern Mexico; in winter to Lower California, the valley of Mexico, and the State of Guerrero, Mexico.

The Black-chinned Hummingbird, also known as the "Purple-throated" and "Alexandre's" Hummingbird, is rather irregularly distributed throughout the western United States, and, while exceedingly abundant in some localities, in

others, apparently equally well suited, it is comparatively rare. It has not yet been recorded, so far as I am aware, from any point west of the Cascade Mountains in Oregon and Washington, and, in fact, it must be considered as rather rare throughout the eastern portion of these States and Idaho.

Mr. John Fannin, curator of the Provincial Museum at Victoria, British Columbia, in his "Check List of British Columbia Birds," says: "Confined to the mainland; both slopes of the Cascades."

Mr. R. S. Williams took a single specimen at Columbia Falls, Montana, on May 27, 1893, and a few others were seen subsequently. He writes me: "In this State they do not appear to breed east of the Rocky Mountains."

Mr. Frank M. Drew records it from Colorado, where it has been observed up to 6,000 feet, and Mr. C. F. Morrison, in a list of birds of La Plata County, in the same State, reports it as common and breeding, saying: "A nest shown me contained three eggs."[1]

There are specimens in the United States National Museum collection from New Mexico, Arizona, California, Nevada, Utah, and Texas. In the latter State Mr. H. P. Attwater has found it nesting at San Antonio, and Mr. William Lloyd in Tom Green and Concho counties, which places mark about the eastern limits of its breeding range. It is only a summer visitor in the United States and British Columbia, and breeds wherever found. Throughout the greater portions of Arizona, southern Utah, and southern and southeastern California it breeds abundantly, and is apparently as much at home in the hot valleys bordering the Colorado Desert as in the higher Sierra Nevadas, where Lieut. H. C. Benson, Fourth Cavalry, United States Army, took four of its nests and eggs on May 29, 1892, in the Sequoia National Park, at an altitude of over 9,000 feet; while in semitropical San Diego County, California, judging from the number of breeding records I have, it is, if anything, still more common.

Mr. F. Stephens writes me: "I have taken the nest and eggs of the Black-chinned Hummingbird near Fort Bayard, New Mexico, in 1876, where this species is rather common, and it is an abundant summer resident of southern California, below the pine zone. I have also found a set of eggs of this species near San Bernardino, California, laid in a nest of the House Finch, *Carpodacus mexicanus frontalis*. No lining had been added, or any other changes made; the bird evidently was in haste to lay, her nest, perhaps, having been suddenly destroyed."

The general habits of the Black-chinned Hummingbird are very similar to those of the eastern Ruby-throat. Ordinarily it makes its appearance along our southern border early in March, returning south about the 1st of October. Its call notes and actions during the mating season resemble those of the former, and, like it, the bulk of its food consists of minute insects.

Mr. R. H. Lawrence writes me: "On June 18 and 19, 1894, in Los Angeles County, California, the Black-chinned as well as Anna's and Costa's Hummingbirds were very common in a little tract of wild tobacco, *Nicotiana glauca*, of

[1] The Ornithologist and Oologist, Vol. XIII, 1888, p. 107.

about 2½ acres in extent, situated at the southern slope of a swale or draw on Angelano Heights. These trees bear clusters of slender, yellow, tube-shaped flowers, and are from 12 to 20 feet in height; the tract is known as 'Hummer's Patch.' I saw from seventy to eighty Hummingbirds here in less than two hours, during the hottest part of the day. Many are killed by the boys with spring and air guns in pure wantonness. No nests were found, and males appeared to be more abundant than females. I also found these three species very common in the dry wash of Saw-Pit River, in the same county. Here they were attracted by a bright red flower (*Delphinium cardinalis*) growing on a clean, slender, juicy stalk, from 2 to 6 feet high This plant was abundantly scattered among the low bushes of a level tract of a few acres, and appeared to be a favorite feeding place for different species."

In the vicinity of Tucson, Arizona, where this species is common, I have frequently seen it feeding in the flowers of the mescal (*Agave americana*), as well as in those of several species of yuccas, undoubtedly attracted by the numerous small insects harbored by them. Two nests, with young, probably three or four days old, were found by me saddled on willow branches, on the banks of Rillito Creek, on May 30, 1872, one 4, the other 7 feet from the ground.

In southern California nidification commences ordinarily about the latter part of April or the beginning of May, but I have seen it stated that a set of eggs has been found near Los Angeles, California, as early as February 6, possibly a misidentification, the nest really belonging to *Calypte anna*, which is well known to occasionally breed this early. Throughout the greater part of their range, however, it rarely begins laying before May 1, and the season is at its height through this month, while second or possibly third sets are found up to the latter part of July, and occasionally still later. The nest is readily distinguishable from that of the Ruby-throated Hummingbird by not being covered on the outside with lichens. It is composed of plant down, varying in color from white to buff; the latter is obtained from the under side of the young leaves of the sycamore, the former probably from willows, milkweed, or thistles. These materials are well worked together, and the outside of the nest is thickly coated with spider web. In an occasional specimen a small leaf or two, or a few flower blossoms of the oak are worked in the outer walls. In a specimen from Marfa, Texas, the outside is well covered with small flower spikes, the male aments of a species of oak, hiding the inner lining completely.

A beautiful nest now before me, taken by Mr. F. Stephens, near Owens Lake, Inyo County, California, No. 24329, United States National Museum collection, is mainly composed of white willow down, mixed on the outside with a few small leaves and the scales from the willow buds; these are firmly held in place by an abundance of spider web, with which it is also securely attached to the little fork in which it is saddled. The outer diameter of this nest is about 1⅜ inches by 1 inch in depth; the inner cup is 1 inch in diameter by five-eighths of an inch deep; and while some specimens before me are a trifle larger, others are considerably smaller. Nests taken in the Sequoia National Park, in

Tulare County, California, have perceptibly thicker walls than those from the warmer lowlands, and are also correspondingly larger. The nests are either saddled on a small, drooping branch or on a fork, one or two of the smaller twigs composing this usually being incorporated in the walls and holding it securely in place. Many of the nests resemble small, fine sponges, and are equally elastic, readily regaining their shape after being squeezed together. They are generally placed from 4 to 8 feet from the ground, mostly in the shrubbery found near small creeks or springs, and frequently their nests overhang the water or the dry creek bed. Alders, cottonwoods, oak, sycamore, laurel, and willows are most often selected for nesting sites, as well as young orchards, especially apple and orange trees, where they are available.

In the more southern portions of the range of the Black-chinned Hummingbird fresh eggs are occasionally found by May 1, and as late as the beginning of August. Although most of our Hummingbirds invariably lay but two eggs to a set, nests of this species now and then contain three, all evidently laid by the same female, and such instances do not appear to be especially rare. Three such cases have come to my knowledge within the last few years. Dr. C. Hart Merriam found a set of three in the lower Santa Clara Valley, Utah, in May, 1891. Mr. F. Stephens took another at Olancha, Inyo County, California, on May 16, 1891, which is now in the United States National Museum collection, and Mr. Fred. H. Fowler obtained still another near Fort Bowie, Arizona, in the spring of 1893.

The eggs of the Black-chinned Hummingbird resemble those of the Ruby-throat in shape and color, but average a trifle smaller.

The average measurement of fifty-three specimens in the United States National Museum collection is 12.67 by 8.31 millimetres, or about 0.50 by 0.33 inch. The largest egg of the series measures 13.72 by 8.64 millimetres, or 0.54 by 0.34 inch; the smallest, 11.94 by 8.13 millimetres, or 0.47 by 0.32 inch.

The type specimen, No. 24257 (not figured), from a set of three eggs, was taken by Mr. F. Stephens, on May 16, 1891, near Olancha, Inyo County, California, the nest being saddled on a small twig of an apple tree in a young orchard, about 7 feet from the ground.

## 70. Trochilus violajugulum Jeffries.

VIOLET-THROATED HUMMINGBIRD.

*Trochilus violajugulum* Jeffries, Auk, V, April, 1888, 168.
(B —, C —, R —, C —, U 429.1.)

Geographical range: Southern California (Santa Barbara County).

The Violet-throated Hummingbird was first described by the late J. Amory Jeffries in "The Auk" (Vol. V, 1888, pp. 168, 169), from a specimen, a male, shot near Santa Barbara, California, on April 5, 1883, and the type, I believe, still remains unique. Nothing whatever is known regarding its habits or the extent of its range. It appears to be a perfectly good species, and was probably a straggler from the south.

## 71. Calypte costæ (Bourcier).

COSTA'S HUMMINGBIRD.

*Ornismya costæ* Bourcier, Revue Zoologique, ii, 1839, 294.
*Calypte costæ* Gould, Monograph of the Trochilidæ, Part XI, 1856, and Vol. III, 1861, Pl. 134.
(B 106, C 280, R 337, C 415, U 430.)

Geographical range: Western North America; north to southern California, southern Nevada, and southwestern Utah; east to western and through southern Arizona to southwestern New Mexico; south to Lower California and northwestern Mexico to Mazatlan, Sinaloa, Mexico.

The northern limits of the range of Costa's Hummingbird have recently been considerably extended, and it is now known to be a common summer resident in southeastern California, at least as far north as Owens Valley, Inyo County, in about latitude 36° 20′; it reaches a slightly higher latitude in southern Nevada, while the northernmost point of its range, as far as known, is to be found in the extreme southwestern corner of Utah, on the eastern slopes of the Beaverdam Mountains, where Dr. C. Hart Merriam found it common among the junipers, somewhat north of the thirty-seventh parallel.[1]

On the west coast of California it has as yet only been taken as far north as Ventura County, and it is evidently rare there. In Arizona it seems to be distributed over the western half of the territory, as well as over most of the southern sections. Its breeding range is coextensive with its geographical distribution in the United States. The majority of Costa's Hummingbirds appear to be only summer residents within the United States. Mr. W. W. Price, a careful and reliable observer, states, however, that it winters in limited numbers in southern California; and the fact that he found a nest of this Hummingbird containing young as early as January 28, 1887, near Riverside, in San Bernardino County, seems to confirm this, and I have no doubt that other species also winter in suitable localities in the Colorado Desert, in the vicinity of the few springs and water holes found there. Dr. Edgar A. Mearns, United States Army, found this Hummer quite common at Tinachas, in southwestern Arizona, near the head of the Gulf of California, between February 16 and 21, 1894, and collected a number of specimens there. Its general habits do not differ much from those of the other members of this family found within our borders, excepting that it is somewhat more of a desert-loving species, and it seems to show a special preference for the few water holes and springs in the barren mountain ranges in southeastern California east of the Sierra Nevadas. In such localities it appears to be far more common than in the better watered and more fertile portions of the southwestern parts of the State.

Dr. A. K. Fisher says: "Costa's Hummingbird is the common species of the desert valleys and mountains of southern California and Nevada. * * * In the Argus Range, California, the species was very common at Maturango

[1] North American Fauna, No. 7, 1893, pp. 56–58.

Spring, and in Shepherd Canyon, where several nests were found in low bushes along the edges of the canyon. * * * At Coso the species was also very abundant, and several of its nests were found. Various kinds of plants were used as nesting sites, though the branching cactus (*Opuntia echinocarpa*) was most commonly chosen. Usually the structure was placed on the top of a lower branch, a foot or so from the ground, and under an overhanging mass of thick, spiny branches, which formed a protection for the parent bird from the sun and weather as well as its enemies. At Coso one of these Hummers was seen on a bright moonlight evening hovering about a bunch of flowers, and was heard again later in the same night. * * * Just at daylight, on the morning of June 25, before the shadow had risen out of Wild Rose Canyon, a Costa's Hummingbird came and hovered within a foot of our camp fire, probably mistaking it, from the distance, for a bunch of bright-colored flowers. It was observed on several occasions that any bright-colored object placed in a conspicuous position attracted this bird."[1]

Mr. F. Stephens writes me regarding Costa's Hummer as follows: "I have found this species breeding in a gulch at the edge of the river bottom near the Gila River, New Mexico, a few miles below old Fort West. In this case I saw the male assisting in building the nest. I distinctly saw him fly to a spider web and gather it in or on his bill while on the wing. He appeared to be winding it about his bill, but I can not be certain of this. When no more of the web was left in sight, he flew a few yards across the gulch, and I saw he was busy at the nest, which I had not seen before. The date was about the end of May, 1876. In southern California this species breeds on the desert side as early as February, but on the coast side not until May. They range and nest up into the pines, but are most common in the foothills. They prefer certain canyons for nesting, and I know at least one canyon where I could be reasonably certain of getting half a dozen or more sets in two hours' search in the latter part of May. The nests of this species are not as compactly built as those of *Trochilus alexandri*."

Mr. R. H. Lawrence writes me from Los Angeles, California, as follows:

"On May 21, 1893, I found a half-finished nest of what I took to be *Calypte costæ*, with the female working on it. On the 25th, at 9 a. m., it contained one egg, and on May 26, at dusk, it held two. On June 9 the eggs were still unhatched; the young hatched on the 11th. On June 23, 1894, in the mouth of Saw-Pit Canyon, I found a nest of this Hummer on the end of the lower branch of a sycamore. It was about 4 feet from the ground and near running water, well hidden under a thick canopy of sycamore leaves, which came down to within 2 inches of it, so close as to several times give the female some trouble to perch upon the nest. The nest was placed on the forks of a branch, and made of the down of sycamore leaves and of cobwebs. It held two very young birds. On June 25 I again visited it, and waited to see the mother feed the young ones. I finally found I could stand within 4 feet of the nest, and removed several of the leaves of the canopy for a better view. It was then

[1] North American Fauna, No. 7, 1893, pp. 56–58.

about 12.45 p. m.; the day was warm. The parent's trips were not frequent. She fed the young by touching the point of her bill to the tips and sides of the bills of her youngsters, as if to urge or invite them to stir and open their mouths, not inserting her bill over one-fifth or one-fourth of its length. Once she thrust it down half its length into the throat of one nestling, who then clung to it to the very last moment of its withdrawal, apparently reluctant to let the very smallest particle of the regurgitated food miss its way or remain on the parent's bill. The performance was rather ludicrous, as both old and young, especially the youngsters, went through many wriggling and squirming motions. The parent certainly once, upon returning to the nest, brooded the young ones for a little while, and then fed one before leaving the nest. It was interesting to watch the female raise her crown feathers when settled into a more comfortable position in the nest, and then, upon being alarmed by me, flatten the feathers down, her eyes sparkling with fright. If I winked an eye she was startled, as I stood so near. Once, upon her return, settling down to brood the youngsters, she kept up for some moments a kind of paddling motion, as if she were giving them a little massage treatment. Her respiration was very rapid after this exertion. Life with these atoms of sensitiveness must be at white heat always. The young were lying side by side, but headed in opposite directions. Both had voided excrement in one case, but the parent did not remove either deposit while I was there. Except for this and a piece of eggshell, the nest appeared clean. The young had a narrow strip of long hairs down the center of their backs. Their skins were a dark, dirty brown; bills were very short, tipped with a point, and light colored; eyes were shut. No male parent was seen. The nest and contents were left undisturbed for future observations, if it is possible to visit it soon again."

Mr. A. W. Anthony found Costa's Hummingbird common in Lower California, and writes me: "Just before I left the higher benches of the San Pedro Martir Mountains, on May 29, 1893, *Calypte anna* became rather common, and *Calypte costæ* still more so; both showed signs of early breeding. Valley birds had raised one or more broods by that time. Could it be that these had bred in lower altitudes before coming here?" Mr. Anthony's surmise that these birds might have already reared one or even two broods in the lower and hotter valley regions is undoubtedly correct, as Mr. Walter E. Bryant, in his paper on the "Birds of Lower California," mentions finding a nest of this species on Santa Margarita Island, on January 17, 1888. This was placed on an almost leafless branch, 3 feet high, far from the water, and contained large young.

Mr. B. T. Gault, in a recent letter says: "It may be a peculiarity of Hummers in general, but I found these birds to be exceedingly tame; indeed, it was almost impossible to keep them off their nests after they had been frightened from them; the female would persist in alighting on the nest even when an attempt was being made to sever the twig on which it was placed from the larger branch. Their extreme disregard for the presence of man was a little ahead of anything I had expected to see."[1]

[1] For a more detailed account of the nesting habits of Costa's Hummer I refer the reader to Mr. Gault's article in The Auk, Vol. II, 1885, pp. 309–311.

In Inyo County, California, Costa's Hummer seems to be very commonly found about the flowers of the squaw cabbage, a species of *Stanleya*, also about wild rose, plum, or cherry bushes (*Prunus*) growing in the canyons, as well as about other shrubs and plants found in these desert regions. Nidification commences sometimes early in January; several of its nests and eggs have been taken in Los Angeles County, California, in February; throughout the greater portion of its range, however, it is at its height during April and May, and at least two broods are regularly raised in a season. Considering the small size of most of our Hummingbirds, sixteen days, or even fourteen only, appears to be an unusually long time to be required to hatch such a small egg, and it seems to be entirely out of proportion when compared with many larger birds, and in this respect this family shows its close relationship to the Swifts (*Cypseli*), where incubation lasts still longer.

The nests of Costa's Hummingbird do not compare favorably in architectural beauty with those of the preceding species; the materials used are not so thoroughly felted or quilted together, and the inner cup has ordinarily a rather slovenly appearance. It is externally composed of plant down or fine shreds of plant fiber; the outer walls are thatched more or less profusely, in different specimens before me, with bits of gray lichens, fine shreds of bark, and small dry leaves, and these are securely fastened in place by spider web and silk obtained from cocoons. The inside is lined with plant down, and occasionally with finely shredded plant fibers and small, fluffy feathers. In some examples feathers are very prominent among the inner lining. An average specimen measures $1\frac{3}{8}$ inches in outer diameter by 1 inch in depth. The inner cup is about seven-eighths of an inch in diameter by one-half inch in depth. They are usually placed in low situations, from 1 to 6 feet from the ground, rarely higher, although Mr. W. E. D. Scott records one taken on May 5, 1882, near Riverside, in southern Arizona, from the extremity of a cottonwood branch 35 feet from the ground. In the desert regions of southeastern California various cacti, the different species of sage (*Artemisia*) and greasewood bushes (*Larrea*), while in the canyons ash, sycamore, scrub oak, palo verde, cottonwoods, and willows, furnish their favorite nesting sites. The eggs resemble those of the preceding species in shape and color, but they are somewhat smaller.

The average measurement of twenty-three specimens in the United States National Museum collection is 12.19 by 7.87 millimetres, or 0.48 by 0.31 inch. The largest egg measures 12.95 by 8.13 millimetres, or 0.51 by 0.32 inch; the smallest, 11.68 by 7.62 millimetres, or 0.46 by 0.30 inch.

The type specimen, No. 24250 (not figured), from a set of two eggs, was taken by Dr. A. K. Fisher in Shepherd Canyon, in the Argus Mountains, California, on May 7, 1891, and the nest from which these eggs were obtained was placed on a little fork of a greasewood bush, 2 feet from the ground, very poorly built, and probably an old one from the previous year.

## 72. Calypte anna (Lesson)

ANNA'S HUMMINGBIRD.

*Ornismya anna* Lesson, Supplement des Oiseaux Mouches, 1831, 115, Pl. 7.
*Calypte anna* Gould, Monograph of the Trochilidæ, Pt. XI, 1856, Pl. 5; and Vol. III, 1861, Pl. 135.

(B 105, C 279, R 338, C 415, U 431.)

Geographical range: Western North America; north through southern and middle California to about latitude 41°; east to the Sierra Nevada; south to northern Lower California and Cerros Island, and through southern Arizona; in winter to northern Mexico. Casually? to Guadalupe Island, Mexico.

The breeding range of Anna's Hummingbird, one of the handsomest species found in the United States, appears to be a rather restricted one, and, as far as known at present, seems to be confined to those regions of California situated between the coast and the Sierra Nevadas, and to the northern half of Lower California. Quite a number of these birds winter regularly in southern California, while others pass, during their fall migration, through southern Arizona, and likely also through southwestern New Mexico, en route to their winter haunts in northern Mexico. Mr. H. W. Henshaw met with Anna's Hummingbird in the vicinity of Camp Grant, Arizona, during the last week of September, 1873, while they were evidently migrating, and Mr. W. E. D. Scott obtained a single specimen in the Santa Catalina Mountains, in the same territory, on October 1, 1883. If it should prove to be a summer resident in Arizona, its nests and eggs must be looked for in the canyons of the mountains at altitudes of from 5,000 to 7,000 feet. It usually returns to its breeding grounds very early in the spring. Its general habits, food, etc., resemble those of the other species already rather fully described, and the breeding season begins occasionally in February and lasts into July, during which time two, if not three broods are raised.

Mr. Charles A. Allen, of Nicasio, California, writes me: "The male Anna's Hummingbird has a very nice little song; it may often be seen perched on some prominent twig or a telegraph wire singing away for dear life. Its simple little lay sounds like 'te-uit, te-uit, te-wieu, wieu, wieu,' repeated over and over again, and when angry it utters a very harsh, rasping screech. In this vicinity it is migratory, usually arriving about the second week in February."

Mr. F. Stephens sent me the following notes on this species: "When I first came to California I confused the females of this species with those of *Trochilus alexandri*, and thought that *Calypte anna* was a summer resident in the valleys. Others appear to have made the same mistake. My present belief is that *Calypte anna* seldom or never breeds below the pine region of the mountains of southern California, except possibly immediately along the coast, and of this I have no certain knowledge. I do know the species is found, though rather rarely, in the pines in May and June. It is an abundant winter resident in the valleys.

Lately (September 27, 1892, at San Diego) I heard the song of this species. It was harsher than the song of *Trochilus alexandri* or *Calypte costæ* and could be heard further."

Mr. Rollo H. Beck, of Berryessa, California, says: "Anna's Hummingbird is a common summer resident here, and a few remain through the winter. I often notice these birds hunting for spiders among the evergreen trees near my home; they frequently visit the flowers about the houses in the valleys, and they also have an abundance of wild ones to select from in the hills, from the time they arrive in the spring until they leave in the fall. In March, when the Australian or blue gum trees begin to blossom, this Hummer and the Rufus are very numerous, chasing each other from tree to tree all day long; all the time uttering their notes of defiance or hatred. Although somewhat larger in size than the Rufus, I believe the latter generally gets the best of it."

Mr. A. W. Anthony has kindly sent me the following notes on *Calypte anna:* "A nest of this species was found at San Quentin, Lower California, in a cholla cactus growing within a few feet of the bay. A piece of cotton was pushed down over the eggs to prevent their rolling out, and nest and all transferred to a box in my game bag. Upon arriving at my tent, an hour later, I was somewhat disgusted to find one of the eggs pipped, and realizing the difficulty of making a presentable specimen of it, was on the point of throwing it away, when a movement on the part of the tiny creature within the shell suggested to my mind that I hatch the egg and find out for myself how baby Hummingbirds come into the world. So far there was but a pin point broken, the rest of the shell being intact; and it was several minutes before the warmth of my hand, aided by my breath, produced another movement upon the part of the prospective Hummer; first a feeble struggle, followed by an interval of rest; another squirm, and the point of the bill came in view and was withdrawn; after a moment's rest a new system was adopted, which consisted of turning around in the shell from right to left, and cutting a clean, smooth opening with the sharp, horny tip on the upper mandible; this operation was evidently hard work, and required all the strength of the little mite, and frequent rests were necessary to recruit. Sometimes an interval of twisting seemed to accomplish nothing, and it would look as if all its struggles would be in vain, and I wondered whether the parent would not render a little much-needed assistance at this stage; but after an interval of rest the work would be continued with renewed vigor and another millimetre cut toward the outer world. The cutting was all done in the same direction, and after about ten minutes I was obliged to turn the egg over in my hand in order to watch the proceedings, as by that time the opening had been cut about half way around, bringing the chick's bill nearly underneath and in the palm of my hand. When the shell had been cut four-fifths around, the chick succeeded in getting one claw hooked over the edge of the break, and by one or two vigorous pushes broke the remaining shell, leaving in my hand two nearly equal parts of what had been a Hummingbird's egg, and a squirming something that bore no semblance whatever to one of the peerless members of

the genus *Calypte*. The entire operation of hatching, from the time I discovered that the egg was pipped, consumed about fifteen minutes.

"In Lower California the nesting season extended from January to June, and perhaps longer. One of the nests found by me near my camp at Valladares, Lower California, was built within 8 feet of a blacksmith's forge, where the smoke constantly obscured nest, bird, and all; but the structure was finished and the eggs laid in spite of the noise and confusion."

Besides spiders, small insects, etc., and the nectar of different kinds of flowers, Anna's Hummingbird is said to be extremely fond of the sap of the willow (*Salix lariolepis*), and it has also been observed hovering about the punctures made by the Red-breasted Sapsucker (*Sphyrapicus ruber*) in fruit orchards.

Nidification, as already stated, begins very early in California, occasionally in January, but more often in February, and, as a rule, but few of the first nests are found. The second sets find their way into collections more frequently, however, and the season for these is at its height in April or the first half of May. At this time they retire farther into the foothills and nest mostly among the shrubbery along the numerous small creeks found in the canyons of the mountains, following up the flowers, in which they find a considerable portion of their daily food, and which usually bloom somewhat later in such localities.

The nests of Anna's Hummingbird also differ somewhat from those of the previously described species in their general make-up, and can in most cases be readily distinguished from them. The inner walls are likewise composed of various kinds of plant down, that found on the under side of the leaves of sycamore being perhaps most frequently used, while willow and thistle down enters less often into their composition. Some of the early nests are almost entirely composed of the flowers of the *Eucalyptus*, the Australian gum tree. The outer walls are covered with soft green tree mosses and lichens, principally the former, and these are held firmly in place by spider webs and cocoons. The inner cup is lined with fine plant down and a few soft, fluffy feathers (apparently those of the female) and occasionally with fur. A well-preserved, average-sized specimen, taken near Santa Cruz, California, on May 14, 1872, measures about $1\frac{5}{8}$ inches in outer diameter by $1\frac{1}{4}$ inches in height; the inner cup is 1 inch in diameter by five-eighths of an inch in depth; while one kindly sent me by Mr. C. Barlow, of Santa Clara, California, taken by him on February 11, 1894, containing two slightly incubated eggs, has much thicker walls and is profusely lined with soft feathers of the Western Bluebird. It was saddled on a horizontal twig of a cypress about half an inch thick and 15 feet from the ground. He writes: "This was the first Anna's Hummingbird's nest found by me in 1894. On the same day several pairs were seen and one pair was found to be building on the remains of a last year's nest, which contained fresh eggs on February 21. At this season of the year it is usually rainy; the sun generally rises bright, but is soon obscured by clouds. I noticed that a large majority of these early nests were built on the east side of the trees, which appeared to me as being done perhaps so as to catch the rays of the sun while it shone for per-

haps an hour. Later on the nests were built almost anywhere. As a rule, the early Hummers here build in cypress (often called 'cedar') trees, and the nests are usually lined with feathers. I suppose this is due to the lack of vegetable down, which is plentiful later, for I have never found a late nest lined with feathers. A nest found on February 22 was lined with red cow hair and looked quite odd. Other of these early nests were lined with Western Bluebird's or Western Robin's feathers, while one contained a large feather of some Owl."

The nests are most often placed on low branches or twigs overhanging water courses, in sycamore, maple, cottonwood, alder, or sumach trees or bushes, at no great distance from the water; and again they may be found in cypress, Australian blue gum, elder, box elder, and in orchard trees, such as orange, peach, and plum. In Lower California Mr. A. W. Anthony found it also nesting in cholla cactus. Nests are sometimes placed within a foot of the ground, and others fully 35 feet up, the average being from 8 to 15 feet. They may be saddled on a small, drooping limb, or placed in the forks of small twigs; in either case they are substantially built structures and well secured to their surroundings.

Only two eggs are laid to a set, and these, like all Hummingbird's eggs, are dull white in color and elliptical oval in shape. Incubation lasts from fourteen to sixteen days, and the male does not assist in this duty.

The average measurement of twenty-four specimens is 13.29 by 8.76 millimetres, or about 0.52 by 0.34 inch. The largest egg measures 14.22 by 8.89 millimetres, or 0.56 by 0.35 inch; the smallest, 12.70 by 8.38 millimetres, or 0.50 by 0.33 inch.

The type specimen, No. 21748 (not figured), from a set of two eggs, Bendire collection, was taken by Mr. William A. Cooper, near Santa Cruz, California, on May 14, 1872.

## 73. Selasphorus floresii Gould.

FLORESI'S HUMMINGBIRD.

*Selasphorus floresii* Gould, Monograph of the Trochilidæ, Pt. XXIII, September 1, 1861, Pl. 10; and Vol. 3, 1861, Pl. 139.

(B —, C —, R —, C —, U 431.1.)

Geographical range: Southwestern Mexico, Jalisco, and Oaxaca; accidental to California.

Floresi's Hummingbird or Flame-bearer, an exquisitely plumaged species, can be considered only as an accidental straggler within the borders of the United States, and still remains very rare in collections. It was obtained at Bolanos, Oaxaca, Mexico, in 1845, and remained unique for some time. More recently it has been reported from the State of Jalisco, and Mr. Walter E. Bryant found a specimen in a taxidermist's shop in San Francisco, California,

which had been mounted as a hat bird; he was assured that it had been killed near that city, which entitles it to a place in our fauna.[1]

Nothing appears to be known as yet regarding the life history of this handsome species.

## 74. Selasphorus platycercus (Swainson).

BROAD-TAILED HUMMINGBIRD.

*Trochilus platycercus* Swainson, Philosophical Magazine, I, 1827, 441.
*Selasphorus platycercus* Bonaparte, Conspectus Avium, I, 1850, p. 82.
(B 104, C 278, R 339, C 413, U 432.)

Geographical range: Mountain regions of western North America; north in the United States to Wyoming and Idaho; east to the eastern slopes of the Rocky Mountains and adjacent ranges in Colorado and New Mexico; west to the Sierra Nevada and western Arizona, as well as in the intervening regions; south through Arizona, southern New Mexico, and western Texas, over the Mexican table-lands to Guatemala, Central America.

The Broad-tailed or Rocky Mountain Hummingbird is pretty generally distributed throughout the various mountain systems between the eastern slopes of the Rocky Mountains and the Sierra Nevadas. It can only be considered as a summer resident in the United States, retiring over the table-lands of Mexico southward to Guatemala in winter. It usually makes its appearance along our southern border in Arizona and New Mexico early in March, and returns south in the latter part of September or the beginning of October. As far as yet known, it reaches the northern limits of its range in southern Wyoming and Idaho, and is an exceedingly abundant species throughout the mountains of Nevada, Utah, Colorado, New Mexico, and Arizona. The Sierra Nevadas seem to form the western boundary of its range, and it apparently does not occur west of these mountains in California. In June, 1876, while en route from Camp McDermit, Nevada, to Camp Harney, Oregon, I observed several Hummingbirds among the willows beside a little brook along the southern slopes of Steen's Mountain, in southern Oregon, which I am almost certain belonged to this species, but not being prepared for collecting, I was unable to secure specimens. Dr. C. Hart Merriam records a specimen taken at Big Butte, Idaho, which is located in about the same latitude, on July 19, 1890, and I have no doubt that its range will yet be extended into southeastern Oregon. I also met with this species as a rare summer resident in the foothills of the Santa Catalina Mountains, in southern Arizona, and obtained a single nest containing two nearly fresh eggs, placed on a small cottonwood twig in a canyon, about 3 feet from the ground, at an altitude of about 4,800 feet, on June 11, 1872. It did not appear to breed in the valley of Rillito Creek.

In eastern Colorado it appears to be the only representative of this family, and is exceedingly abundant. Mr. W. G. Smith writes me from Larimer County, in this State: "The Broad-tailed Hummer is common in the mountains from

[1] Forest and Stream, Vol. 26, p. 426.

7,000 feet up to timber line, nesting almost everywhere between these points; and a large pine tree seems to answer equally well for a nesting site as a small bush. In trees the nest is frequently saddled on a large limb, but it is more often placed in low bushes, particularly on willow branches overhanging water. The male has a curious habit of flying up almost perpendicularly, 100 feet or more, in the vicinity of the selected nesting site, and he frequently repeats this performance three or four times in succession before alighting on some dead limb. The female is very loath to leave her eggs, and if driven off will return again directly, even though the intruder's hand is placed within a few inches of the nest."

As far as my limited observations go, all of our Hummingbirds indulge in this perpendicular flight during the nesting season, and not a few of the nests were found by me while watching these birds go through this performance, which is not alone confined to the male; the female also does it. On the first arrival of this species in the spring it is comparatively common in the lower foothills and valleys, and unquestionably breeds here. By the time the young are large enough to leave the nest the majority of the flowers have ceased blooming, and as the country begins to dry up more and more these Hummingbirds retire to higher altitudes in the mountain parks, where everything is now as green and bright looking as it was in the lower valleys two or three months earlier. Here they raise their second broods under nearly similar conditions as the first; the former are by this time well able to take care of themselves and can be seen frolicking about everywhere. These vertical migrations, if they can be called such, frequently account for the entire disappearance of certain species in summer from localities where they may have been exceedingly numerous a couple of months earlier, and the gradual diminution or actual scarcity of the food supply plainly accounts for the sudden change in their habitat.

Mr. Robert Ridgway writes: "The flight of this Hummingbird is unusually rapid, and that of the male is accompanied by a curious screeching buzz while it is followed through an undulating course. Long before the author of this curious sound was detected its source was a mystery to us. This shrill, screeching note is heard only when the bird is passing rapidly through the air, for when hovering among the flowers its flight is accompanied by only the usual muffled hum common to all the species of the family."[1]

According to Dr. C. Hart Merriam, the Broad-tailed Hummer is very abundant in the balsam belt and the upper parts of the pine belt in the San Francisco Mountain region in Arizona. In "North America Fauna," No. 3, 1890 (p. 93), he says: "A nest containing two nearly fledged young was found on the limb of a Douglas fir, about 4 feet from the ground, July 31. The principal food plant of this Hummingbird is the beautiful scarlet trumpet flower of *Pentstemon barbatus torreyi*. During the latter part of August and early September, after it had ceased flowering, these birds were most often seen in the beds of the large Blue Larkspur (*Delphinium scopulorum*). They wake up early in the morning

[1] U. S. Geological Explorations of the 40th Parallel, 1877, p. 561.

and go to water at daylight, no matter how cold the weather is. During the month of August, and particularly the first half of the month, when the mornings were often frosty, hundreds of them came to the spring to drink and bathe at break of day. They were like a swarm of bees, buzzing about one's head and darting to and fro in every direction. The air was full of them. They would drop down to the water, dip their feet and bellies, and rise and shoot away as if propelled by an unseen power. They would often dart at the face of an intruder as if bent on piercing the eye with their needle-like bill, and then poise for a moment almost within reach before turning, when they were again lost in the busy throng. Whether this act was prompted by curiosity or resentment I was not able to ascertain. Several were seen at the summit of the mountain during the latter part of August. They were found also at the Grand Canyon of the Colorado September 12 to 15. They began to leave the mountain during the first week in September, and none were seen after the middle of the month."

The flowers of the *Scrophularia*, *Ocotilla*, *Agave americana*, and numerous others, have great attractions for them owing to the quantities of small insects which they harbor. In the more southern portions of their range nidification commences late in April or the beginning of May, but most of these early sets are generally overlooked, while the second sets are usually laid about the first two weeks in June, and nesting continues throughout July in portions of their range. Mr. Robert Ridgway obtained two nests of this species with eggs in Parley's Park, Utah, on July 23, 1869; they were placed in willows growing beside a stream.

Nests from different localities vary considerably in make-up as well as in size. Nests saddled on good-sized limbs, like those often found in the mountains of Colorado, are occasionally almost as large again as others placed on small twigs. One now before me, from the Ralph collection, taken by Mr. William G. Smith, at Pinewood, Colorado, on June 23, 1892, measures 2 inches in outer diameter by 1⅜ inches in depth, while one taken by Mr. Ridgway, in Parley's Park, Utah, on July 23, 1869, measures only 1⅝ by 1 inch outside measurement. The difference in size of the inner cups of these two nests is even more noticeable, the former measuring 1 inch by three-fourths of an inch, the latter three-fourths by one-half of an inch. While the walls of both of these nests are mainly composed of willow or cottonwood down, their outer covering is entirely dissimilar. The outside of the larger one is profusely covered with small bits of lichens, like the nest of the Ruby-throat; the smaller one is decorated with shreds of bark, fine leaves, and dry plant fibers, resembling more the nests of Costa's Hummingbird in this respect. The radical difference in the appearance of the nests is far greater than my simple description would indicate, and the specimens themselves must be seen to have this difference fully appreciated. There is no doubt whatever of the correct identification of both, but their nests evidently vary greatly in different localities, and while frequently one can form a pretty good guess as to what species certain Hummingbirds'

nests belong, in this instance at least it would be impossible to form a correct idea from the nest and eggs alone, without obtaining the parent. The inner lining appears to be composed entirely of willow or cottonwood down, and none of the specimens before me contain even a single feather. The outer covering or thatching is firmly secured to the walls of the nest with spider webs or silk from cocoons. The majority of the nests of the Broad-tailed Hummingbird are placed on low, horizontal branches of willows, alders, cottonwoods, etc., at no great height from the ground, or overhanging small mountain streams, while others are saddled on boughs or limbs of pine, fir, spruce, or aspens, from 4 to 15 feet from the ground, rarely higher. Occasionally a nest may be placed on a curled-up piece of bark or on a splinter of a broken limb. The length of incubation is probably the same as that of our other species about which somewhat more is known, and two if not three broods are regularly raised in a season. The eggs, two in number, resemble those of the Ruby-throat in every respect, but are a trifle shorter.

The average measurement of fifteen specimens in the United States National Museum collection is 12.70 by 8.33 millimetres, or about 0.50 by 0.33 inch. The largest egg measures 13.21 by 8.38 millimetres, or 0.52 by 0.33 inch; the smallest, 12.19 by 8.13 millimetres, or 0.48 by 0.32 inch.

The type specimen, No. 26793 (not figured), from a set of two eggs, Ralph collection, was taken in Estes Park, Colorado, on June 10, 1892. The nest was placed in the forks of a willow twig, 4 feet from the ground, near the banks of a little mountain brook.

## 75. Selasphorus rufus (Gmelin).

RUFOUS HUMMINGBIRD.

*Trochilus rufus* Gmelín, Systema Naturæ, I, i, 1788, 497.
*Selasphorus rufus* Gould, Monograph of the Trochilidæ, III, 1852, Pl. 137.
(B 103, C 277, R 340, C 411, U 433.)

Geographical range: Western North America; north through British Columbia to about latitude 61° in southern Alaska; east, in the United States, to the eastern slopes of the Rocky Mountains from Montana through Colorado to New Mexico, as well as in the intervening regions; south through California, Arizona, southern New Mexico, western Texas, and the table-lands of Mexico; in winter to Vera Cruz and Oaxaca, Mexico, and Lower California.

The Rufous Hummingbird, also occasionally called "Rufous-backed," "Cinnamon," and "Nootka" Hummingbird, appears to be the most widely distributed species of the *Trochilidæ* found on the North American continent, extending at least over 40° of latitude. It reaches somewhat farther north than the Ruby-throated Hummingbird, and appears to be a tolerably common summer resident in southern Alaska, where Dr. T. H. Bean found it nesting in the vicinity of Sitka on June 9. It has also been observed somewhat farther north on the Alaskan coast, in the vicinity of Mount St. Elias, in about latitude 61°; but

how far it reaches into the interior of this territory is still unknown. In British Columbia it ranges well into the central parts of this province. Mr. R. MacFarlane, to whom we are indebted for so much information regarding North American ornithology in the far north, forwarded a nest and eggs, with the parent, to the United States National Museum. These were taken by him in the vicinity of Fort St. James on June 10, 1889, while en route to the Hudson Bay Company's Post, on Stewart's Lake, in about latitude 54° 40′. It is quite likely that it also reaches the province of Alberta, as it is a moderately common summer resident in northern Idaho, where I found it breeding near Fort Lapwai on June 27, 1871, and Mr. R. S. Williams writes me from Columbia Falls, Montana, that he has found the Rufous Hummer in the valley of the upper Missouri River. Along the eastern slopes of the Rocky Mountains it appears to occur somewhat irregularly. Mr. Denis Gale writes me that he saw a single specimen of this Hummer in Boulder County, Colorado, while Mr. William G. Smith reports it as rare in Larimer County, but tolerably common in Arapahoe County, in the same State. Mr. Frank M. Drew reports it as breeding in the Rocky Mountains up to altitudes of 10,500 feet, while in the southern Sierra Nevadas it is even common above timber line. In our Northwestern States, in Oregon and Washington, especially west of the Cascades, as well as in some of the mountain regions of California, northern Arizona, and New Mexico, the Rufous Hummingbird is a very common summer resident. I have never seen anything like such numbers of Hummingbirds as I met in the vicinity of Fort Klamath, Oregon, about the time this species and the Calliope Hummer passed through there on their spring migration. From the time the wild currant and gooseberry bushes (*Ribes*) begin to flower (and they grow in great abundance among the open pine woods along all the streams in Klamath Valley) they swarm everywhere, and if they had only stayed quiet long enough to count them, I am sure as many as a thousand to the acre could have been found here; they remain very abundant as long as these flowers last. I never saw anything like the numbers anywhere else. Their constant buzzing while flying from bush to bush, about each of which as many as a dozen were perhaps already hovering, and the glitter of their brilliant plumage as they flashed by, chasing each other, was a sight long to be remembered. Few of this species appeared to remain to breed; at any rate, I failed in finding a single one of their nests here, although I searched carefully for them. At Camp Harney, Oregon, along the southern slopes of the Blue Mountains, I found this species a rather rare summer resident along the outskirts of the pine forests.

The Rufous Hummer generally reenters our southern border early in March, passing leisurely northward, and commences its winter migration again from the more northern parts of its range about the 1st of September. I do not believe that any remain within our borders throughout the year.

In Oregon nidification begins occasionally by the second week in April, and a nest containing slightly incubated eggs was found by Dr. Clinton T. Cooke, near Salem, Oregon, on April 18, 1888, while in middle California it

nests now and then nearly a month earlier. A specimen in my collection, taken by Mr. G. H. Ready, at Woods Lagoon, near Santa Cruz, California, contained fresh eggs on March 25, 1875. Throughout the greater part of their range, excepting the more northern portions, the breeding season is at its height during the first two weeks in May and lasts well into July, and two broods are probably raised regularly, excepting perhaps in northern British Columbia and southern Alaska. The nesting habits of the Rufous Hummingbird are very similar to those of the preceding species, and their nesting sites may be looked for in low bushes as well as on horizontal limbs of trees at various distances from the ground.

One of the most complete and interesting articles on the life history of this species is that of Mr. H. W. Henshaw, in "The Auk" (Vol. III, 1886, pp. 76–78), who inclines to the belief that the majority of these birds on the upper Pecos River, New Mexico, breed in the upper limbs of the pines, and, although they were exceedingly abundant there, he only found a single nest, and this only after it had been deserted. I am also of the belief that in certain localities they nest farther from the ground than Hummingbirds usually do. The only nest found by me in the West was at Fort Lapwai, Idaho, as already stated. This was saddled on a little fork of a dry cottonwood twig, overhanging a creek, about 15 feet above the water.

Mr. A. W. Anthony writes me: "I found the Rufous Hummingbird very abundant at Beaverton, Oregon. Here they nested to some extent in oaks, blackberry vines, and on dry roots projecting from upturned trees. One nest hung from the end of a tall fern, while others, drooping over it from above, hid the beautiful structure from all but accidental discovery. Their favorite sites, however, seemed to be the long, trailing vines overhanging embankments and upturned trees. A number were found in railroad cuts; frequently several nests were situated within a few feet of each other, a slight preference being shown to embankments having a southern exposure. One nest was found that had been placed on top of a last year's habitation, a mere rim being built to raise the sides, and a flooring being added to cover up a large pebble that could be plainly felt under the cotton lining. Fresh eggs were found here from May 1 to June 16."

Dr. Clinton T. Cooke found one of their nests, near Salem, Oregon, on a drooping limb of an ash tree, 20 feet from the ground; others were found in waxberry and blackberry bushes. At Table Rock, in the Cascade Mountains, they were very abundant on July 5, 1887, feeding on a *Costelleya*, in blossom at the time.

Mr. R. H. Lawrence met with the Rufous Hummingbird in various parts of Washington, and writes me that it is very common there. His earliest record was March 9, when they had already reached Ilwaco, in the southwestern part of the State. In southern California this species was noticed by him near Monrovia, on March 8, 1894, and at Duarte he often saw Rufous Hummers flitting about the blossom-laden orange trees, in company with other Hummers, in an orchard situated near the foothills.

According to my observations, this Hummer seems to be especially pugnacious, and is apparently more than a match for the other species with which it comes in contact, even if a trifle larger than itself.

The nests of the Rufous Hummingbird resemble those of Anna's very closely in the general make-up, being lined inside with cotton down, while the outside is more or less profusely covered with fine mosses, shreds of bark, and occasionally a few lichens. An average nest measures $1\frac{1}{2}$ inches in outer diameter by $1\frac{1}{4}$ inches in depth; the inner cup is about seven-eighths of an inch in width by one-half inch deep. No feathers, however, are used in the inner lining in any of the specimens before me, as is frequently the case in the nests of Anna's Hummingbirds. Beside the trees, shrubs, etc., already mentioned, they are also occasionally placed in cypress, fir, and other conifers, wild currant, and salmonberry bushes. Mr. Clyde L. Keller, of Salem, Oregon, reports taking a set of three eggs of this species from a nest in a blackberry bush, the only other instance known to me where this number has been found in a Hummingbird's nest, excepting those recorded under *Trochilus alexandri*.

The eggs resemble those of our other Hummingbirds in color and shape. The average measurement of seventeen specimens in the United States National Museum collection is 12.61 by 8.40 millimetres, or about 0.50 by 0.33 inch. The largest egg measures 13.46 by 8.64 millimetres, or 0.53 by 0.34 inch; the smallest, 11.94 by 8.13 millimetres, or 0.47 by 0.32 inch.

The type specimen, No. 21745 (not figured), from a set of two eggs, Bendire collection, was taken by the writer near Fort Lapwai, Idaho, on June 27, 1871.

## 76. Selasphorus alleni Henshaw.

ALLEN'S HUMMINGBIRD.

*Selasphorus alleni* Henshaw, Bulletin Nuttall Ornithological Club, II, 1877, 53.
(B —, C —, R 341, C 412, U 434.)

Geographical range: Western North America; north to southern British Columbia; south through Washington, Oregon, California, and southern Arizona; in winter to northern Mexico and Lower California ?.

The range of Allen's, also known as the "Green-backed," Hummingbird is not very well defined as yet; this is mainly caused by its strong resemblance to the preceding species, making it a very difficult matter to distinguish it positively on the wing, and Allen's Hummingbird is undoubtedly frequently mistaken for the Rufous. It appears to be only a summer resident in the United States and British Columbia, and its breeding range is coextensive with its distribution. Allen's Hummingbird was first discovered by Mr. Charles A. Allen, at Nicasio, California, and was subsequently described by Mr. H. W. Henshaw in the "Bulletin of the Nuttall Ornithological Club" (Vol. II, 1877, p. 53). It is apparently not nearly as common as the Rufous Hummingbird, and comparatively few specimens have been taken outside of California. Mr. R. H. Lawrence records it

from Gray's Harbor, Washington, as a summer resident, perhaps as common as *Selasphorus rufus*, and frequenting similar places. He first noticed it on the east Humptulips River, on April 30, 1891, among salmonberry and other flowering bushes. He writes me that the Edwards Brothers, taxidermists, of Tacoma, Washington, exhibited a mounted pair of these birds and their young in the nest, taken in that vicinity, at the exposition there in October, 1891. He also met with it in different localities in southern California. On August 11, 1894, he shot an adult female about 600 feet below the summit of Mount Wilson, which he kindly forwarded to the United States National Museum, and it was noticed by him as early as March 8 in the vicinity of Monrovia, California.

In southern California it appears to be more a bird of the coast districts than of the interior, and here it is also somewhat irregularly distributed, being fairly abundant in some localities and apparently absent in others. Mr. W. E. D. Scott records a single specimen (an adult male) taken in the Santa Catalina Mountains, in southern Arizona, on July 23, 1884, at an altitude of 4,500 feet. How far south it ranges into Mexico or Lower California during its migrations is still unknown, as no specimens have as far as I have been able to ascertain, yet been obtained from any points in these regions.

In its general habits, food, etc., it resembles our other Hummingbirds. Mr. F. Stephens writes me from San Diego County, California: "The migrating season of *Selasphorus alleni* in spring is rather brief. Possibly a few of these birds breed in the pine region, as I have taken adults and immature birds there at the end of June."

Mr. Charles A. Allen, who discovered this species, and in whose honor it has been named, writes me: "Allen's Hummingbird arrives in the vicinity of Nicasio, California, about the middle of February, and commences to nest soon after arrival. The earliest date on which I found one was February 27, 1879; this was then about half finished, when a heavy storm set in which lasted about five days, and I did not visit the locality again until March 8, when the nest was completed and contained two fresh eggs. I have taken their nests as late as July 3, and am well convinced that two broods are raised in a season, at least by all of the earlier breeding birds. They select all sorts of situations and various kinds of trees and bushes to nest in. I have found their nests as low as 10 inches and again as high as 90 feet from the ground. Their courage is beyond question; I once saw two of these little warriors start after a Western Red-tailed Hawk, and they attacked it so vigorously that the Hawk was glad to get out of their way. But these little scamps were even then not satisfied, but helped him along after he had decided to go. Each male seems to claim a particular range, which he occupies for feeding and breeding purposes, and every other bird seen by him encroaching on his preserve is at once so determinedly set upon and harrassed that he is only too glad to beat a hasty retreat. During their quarrels these birds keep up an incessant, sharp chirping, and a harsh, rasping buzzing with their wings, which sounds very different from the low, soft humming they make with these while feeding. Every action and motion at such times indicates

that they are as mad as can be; the poor Anna Hummers have to get out of their way pretty quickly at any time, but especially when they encroach on their breeding grounds. The males very often have quarrels among themselves, and are then very noisy, while the females are more orderly and quiet; but even they have occasional little misunderstandings with each other, especially when a pair meet while feeding on the same bush; one generally vacates the premises very quickly, and as soon as she does all becomes quiet again. During the mating and breeding season the male frequently shoots straight up into the air and nearly out of sight, only to turn suddenly and rush headlong down until within a few feet of the ground. The wings during the downward rushes cut the air and cause a sharp, whistling screech, as they descend with frightful velocity, and should they strike anything on their downward course I believe they would be instantly killed."[1]

All the nests and eggs of this species in the United States National Museum were taken by Mr. Allen near Nicasio, California; one of these, now before me, is attached to the side of a small oak limb which turns abruptly at an angle of about 45° directly over the cup of the nest, protecting it above; another is likewise attached to the side of a small pendant oak twig, its base being supported by a bunch of moss. Some are securely saddled on small twigs of raspberry bushes, and several of these are usually incorporated in the walls of the nest. Occasionally they nest in hedges, on weed stalks, or on bushes overhanging water.

The nests are well and compactly built, the inside being lined with vegetable down, while the outer walls are composed of green tree mosses and a few bits of lichens, securely fastened in place with a spider web. Nests built on trees seem to be generally somewhat larger than those found in bushes. The average measurements of one of the former is 1½ inches outer diameter and the same in depth; the inner cup is seven-eighths of an inch in width by three-fourths of an inch in depth. On the whole they resemble the nests of Anna's Hummingbird more than those of the Rufous, and appear to me to be better and more neatly built than either.

The eggs of Allen's Hummingbird resemble those of the other members of this family in color and shape, and are a trifle larger than those of the Rufous Hummingbird.

The average measurement of fifteen specimens in the United States National Museum collection is 12.76 by 8.50 millimetres, or about 0.50 by 0.33 inch. The largest egg measures 13.97 by 8.89 millimetres, or 0.55 by 0.35 inch; the smallest, 12.45 by 8.13 millimetres, or 0.49 by 0.32 inch.

The type specimen, No. 27009 (not figured), Ralph collection, from a set of two eggs, was taken near Nicasio, California, on April 13, 1893.

[1] A very interesting account of the habits of this species in captivity can be found in an article by Mrs. C. M. Crowell in the Ornithologist and Oölogist (Vol. 7, 1882, pp. 126–128).

## 77. Stellula calliope (Gould).

CALLIOPE HUMMINGBIRD.

*Trochilus (Calothorax) calliope* Gould, Proceedings Zoological Society, 1847, 11.
*Stellula calliope* Gould, Introduction to the Trochilidæ, 1861, 90.
(B —, C 282, R 343, C 417, U 436.)

Geographical range: Mountainous regions of western North America; north to British Columbia, Idaho, and Montana; east to the Rocky Mountains; south, through California, Arizona, and New Mexico, over the table-lands, to the Valley of Mexico and the State of Guerrero, Mexico.

The Calliope Hummingbird is the smallest of the *Trochilidæ* found within the United States; but, notwithstanding its diminutive size, it is quite hardy, and, on the Pacific Coast at least, it is found 3° or 4° north of our boundary. In British Columbia, according to Mr. John Fannin, it is said to occur on both slopes of the Cascades, and it will undoubtedly yet be recorded from the Province of Alberta, as it is found both in northern Washington, Idaho, and Montana. I have taken it at Fort Colville, Washington, near the line; and have seen it on Pond d'Oreille Lake, in Idaho; while Dr. C. Hart Merriam took an adult female near Fort Ellis, Montana, on July 3, 1872, where it was undoubtedly breeding. Messrs. Richmond and Knowlton obtained an immature bird on August 12, 1888, at Bear Creek, and Mr. R. S. Williams records a specimen from Gold Run, in the Belt Mountains, on May 24, 1882; he writes me that he has also observed it near Columbia Falls, thus showing that this species is pretty generally distributed over the more mountainous and western portions of the State of Montana. These points, according to our present knowledge, mark the northern limits of its known range. I have been unable to find any records of its occurrence in either Wyoming or Colorado; but as it is known to be a summer resident in various parts of both Utah and northern New Mexico, it will probably yet be found along the western slopes of the Rocky Mountains in these two States. It is known to occur in the mountains of California, Arizona, and New Mexico, as well as in suitable localities in the intervening regions, and as already stated extends southward over the table-lands of Mexico. Its breeding range is coextensive with its geographical distribution in the United States.

The Calliope Hummingbird is a mountain-loving species, and during the breeding season is rarely met with below altitudes of 4,000 feet, and much more frequently between 6,500 to 8,000 feet. Its favorite resorts are the open timber found about the edges of mountain meadows and parks, and the rocky hillsides covered here and there with straggling pines and small aspen groves.

Mr. F. Stephens writes me: "*Stellula calliope* is a rare summer resident in California, at least as far south as the San Bernardino Mountains, where I found two nests in 1885. Each contained young recently hatched. The first nest was found May 24, in the canyon of the Santa Anna River, at about 3,000 feet altitude, which must be exceptionally low. The female was seen on the nest; it was driven off and shot, and the skin preserved, so that the identification is unquestionable.

"The nest was built on an old nest of *Trochilus costæ*, which is normal in composition and location. The second nest was found June 23, at about 8,000 feet altitude, on the southern side of Mount Grayback, the highest peak of the San Bernardino range. It was built on a splinter of a knot, or short, broken branch, projecting from the side of a large cedar, about 20 feet from the ground, and also contained young birds. The parent was shot as she flew from the nest, and preserved. This nest is different from the other, and is probably of the normal type. This species is not common even in the migrations."

These are the most southern breeding records of which I have any knowledge. Mr. Charles A. Allen has taken its nests near Nicasio, California, and Mr Charles H. Townsend found it a common summer resident on the McCloud River; the first nest and eggs of this species were taken by the late Capt. John Feilner, First Dragoons, United States Army, on June 4, 1859, near Pitt River, California, and these are now in the United States National Museum collection. Captain Feilner, who was an ardent ornithologist and oölogist, was subsequently killed by hostile Indians while in the pursuit of his favorite study. Although the Calliope Hummingbird is quite a common summer resident in suitable localities, its nests and eggs are still comparatively rare in collections. Both Dr. James C. Merrill, United States Army, and the writer found this Hummingbird quite common at Fort Klamath, Oregon, where I took several of its nests and eggs. Two of the former have been figured in Mr. Robert Ridgway's paper, "The Hummingbirds," in the "Report of the National Museum for 1890" (Pls. 2 and 3), and a quadruple nest of the same species taken by Mr. Charles H. Townsend, near Baird, California, a most remarkable structure, is figured on Pl. 1 in the same publication.

The Calliope Hummer made its appearance at Fort Klamath in 1883 about May 9, possibly a few days earlier, or about the time the wild currant and gooseberry bushes began to blossom, and by the middle of the month I have seen hundreds in a morning's walk. While *Selasphorus rufus* was also quite common at the same time, I believe this species outnumbered it about three to one. Although I searched for their nests most carefully, several weeks passed before I succeeded in finding one, and then its discovery was accidental. I had taken quite a long walk along the banks of Fort Creek on June 10, and, the day being a hot one, sat down with my back resting against the trunk of a bushy black pine whose lower limbs had been killed by fire; while resting thus one of these Hummers buzzed repeatedly about my head for a few seconds at a time, and then rose perpendicularly in the air, only to repeat the performance again. I had no idea then that this species nested in pines, but in order to give me an opportunity to watch its performance better I moved out from under the tree, and a few minutes later saw the bird settle on what I at first supposed to be an old clump of pine cones. On looking closer, however, I noticed its nest, which was ingeniously saddled on two small cones, and its outward appearance resembled a cone very closely. The nest contained two eggs, which were considerably advanced in incubation, and were not disturbed. Knowing now where to look

for them, I had no further difficulty in finding their nests, and all of those observed by me were built in exactly similar situations. I succeeded in obtaining three sets of nearly fresh eggs, and found a number of other nests containing young during the next few days. They were usually placed on or against a dry cone on small dead limbs of *Pinus contorta*, from 8 to 15 feet from the ground, and on account of the brittle nature of these limbs they were rather hard to secure. The nests, while outwardly not as handsome as those of the majority of our Hummers, are nevertheless marvels of ingenuity, all those I have seen mimicking a small dead pine cone so perfectly as to almost defy detection unless one sees the bird fly on or off the nest. The majority found were saddled on one or two such cones, or on a small limb and resting against the sides of a cone. The outer walls are composed of bits of bark and small shreds of cone, and the interior cup is softly lined with willow down. An average nest measures about $1\frac{1}{4}$ inches in outer diameter by the same in depth; the inner cup being three-quarters of an inch in width by one-half inch in depth. The nests were generally so placed that the contents were protected by larger limbs or green boughs above, and at distances varying from 5 to 12 feet from the ground. One I found had a flattened cone projecting directly over it, resembling an opened umbrella. While bushy pines seem to constitute their favorite nesting sites in northern California and Oregon at least, they do not invariably confine themselves to such trees. Mr. Shelly W. Denton took a nest of the Calliope Hummer at Franktown, Washoe County, Nevada, which is now in Mr. William Brewster's collection at Cambridge, Massachusetts. Mr. Denton watched the bird while building it. This is composed interiorly of fine moss and willow down, and the outer walls are decorated with tiny shreds of bark, fine flakes of wood, and flakes of whitewash, fastened securely with cobwebs; it was placed on a knot in a rope hanging from the roof of a woodshed and within 5 feet of an occupied dwelling house. The materials out of which the nest is composed closely assimilate the rope and knot on which it is placed. This nest contained two eggs on June 8, 1887, these being deposited on alternate days. The male was never seen about the nest. The rope (one-third of an inch thick) hung down about 4 feet, so that every time the female settled on the rim of the nest while building she caused it to swing back and forth like a pendulum. This specimen, which I have seen, does not resemble the nests taken by me very closely, and the Calliope Hummer evidently attempts to mimic the immediate surroundings as nearly as practicable. Mr. Walter E. Bryant records another, built upon a projecting splinter of a woodpile, at a height of 5 feet.[1]

The only eggs of this species in the United States National Museum collection are those taken by the late Capt. John Feilner, United States Army, near Pitt River, California, in June, 1859, and three sets collected by myself near Fort Klamath, Oregon. They resemble the eggs of our better known Hummingbirds in shape and color, but are smaller.

[1]Bulletin of the California Academy of Sciences, 1887, p. 452.

The average measurement of eight eggs in the United States National Museum collection is 11.71 by 7.94 millimetres, or about 0.46 by 0.31 inch. The largest egg measures 12 19 by 8.38 millimetres, or 0.48 by 0.33 inch; the smallest, 10.67 by 7.37 millimetres, or 0.42 by 0.29 inch.

The type specimen, No. 21737 (not figured), from a set of two eggs, Bendire collection, was taken by the writer near Fort Klamath, Oregon, on June 11, 1883.

## 78. Calothorax lucifer (Swainson).

LUCIFER HUMMINGBIRD.

*Cynanthus lucifer* Swainson, Philosophical Magazine, 1827, 442.
*Calothorax lucifer* Gray, Genera of Birds, 1848, I, p. 110.
(B —, C —, R 344, C 418, U 437.)

Geographical range: Table-lands of Mexico, from Puebla and the Valley of Mexico north to southern Arizona.

We are indebted to Mr. H. W. Henshaw for the addition of the Lucifer Hummingbird to our fauna. He took a female of this species on August 7, 1874, near Camp Bowie, Arizona, where it appeared to be rare, and, as far as I am aware, no other specimens have since then been taken within our borders. The male resembles Costa's Hummingbird somewhat in size and general coloration, so that it can scarcely be recognized from it on the wing, and might therefore be readily overlooked by the average collector. It appears to be a common species in the more southern portions of Mexico, among the table-lands of Puebla and on the borders of the Valley of Mexico.

The late Mr. Bullock, in his "Six Months in Mexico," gives a description of the nest and eggs of this species, and says: "They breed in Mexico in June and July, and the nest is a beautiful specimen of the architectural talent of these birds; it is neatly constructed of cotton or the down of the thistle, to which is fastened on the outside, by some glutinous substance, a white, flat lichen resembling ours.

"The female lays two eggs, perfectly white, and large for the size of the bird, and the Indians informed me they were hatched in three weeks by the male and female sitting alternately. * * * In sleeping they frequently suspend themselves by the feet, with their heads downward, in the manner of some parrots."[1]

The general habits of this species seem to resemble those of our better-known Hummingbirds very closely. There are no nests and eggs of the Lucifer Hummingbird in the collection, and I am therefore unable to give measurements; but, judging from the size of the bird, its eggs should correspond closely with those of *Calypte costæ*

[1] A fuller account of Mr. Bullock's paper on this species can be found in Mr. Robert Ridgway's paper on the Hummingbirds, in the Report of the National Museum, 1890 (pp. 360–362).

## 79. Amazilia fuscicaudata (Fraser).

RIEFFER'S HUMMINGBIRD.

*Trochilus fuscicaudatus* Fraser, Proceedings Zoological Society, 1840, 17.
*Amazilia fuscicaudata* Ridgway, Proceedings U. S. National Museum, I, 1878, 147.
(B —, C —, R 345, C 419, U 438.)

Geographical range: Northern South America, from Ecuador and Colombia, north through Central America and eastern Mexico, to the lower Rio Grande Valley, Texas.

Rieffer's Hummingbird, a common Central American species, claims a place in our fauna from the fact that a single specimen has been taken at Fort Brown, Texas. This was brought alive to Dr. James C. Merrill, United States Army, for examination, in June, 1876, by one of the soldiers, and a careful description of it was made by the Doctor at the time, as the man wanted to keep it; but it shortly afterwards escaped from him. As it has not been obtained since then in the lower Rio Grande Valley, notwithstanding the fact that considerable collecting has been done there, it can only be considered as a straggler within our borders.

Mr. Charles W. Richmond has kindly furnished me with the following interesting notes on this species:

"*Amazilia fuscicaudata* is extremely abundant in the lowlands of eastern Nicaragua. It outnumbers in individuals all of the other (five) species of Hummingbirds found in the same region. On the Escondido River this species is confined to the banana plantations and the shrubbery around the houses, where it finds an abundance of food and good nesting sites. It is the plantation Hummer, only two other species occasionally wandering into the plantations from the forest, which is the home of the other species. This Hummingbird is inquisitive, like some other Hummers, and often poises 2 or 3 feet from one, changing its position on any conspicuous movement from the object of its curiosity, and when satisfied darts off at great speed, uttering a succession of shrill chirps. Its nest is frequently placed in small orange, lemon, or lime trees, near houses, 4 or 5 feet from the ground. The bird selects any desirable site for a nest, in fact often building it close to the end of the limb of a bamboo hanging out over the river or creek, and in this case usually 6 or more feet above the water. The exterior of the nest is often covered with moss, which in this damp region remains green during the occupancy of the nest and for a long time afterwards, giving it a very pretty appearance. A nest found in October had just been deserted by the young birds, one found late in November contained fresh eggs, one found about the middle of January contained eggs nearly fresh, and another one found the same day was in course of construction. The Spaniards here call Hummingbirds 'garrion.'"

Mr. George K. Cherrie, in his Preliminary List of the Birds of San Jose, Costa Rica, in speaking of Rieffer's Hummingbird, says: "The most abundant species about San Jose, and, indeed, the most abundant species found on either

coast, and up to an altitude of about 6,000 feet. I believe that this species is nesting in every month of the year. Nests are usually placed about 15 feet from the ground, in either orange or lemon trees. A nest before me is constructed of some soft fiber much resembling hemp tow. There are a few lichens covering the outside, and an inner lining of a little native cotton. The nest, somewhat elliptical in form, measures 1½ inches deep by 2 inches long and 1½ wide; inside, 1¼ by seven-eighths by one-half inch deep. The two eggs, white in color and elliptical ovate in form, measure 0.53 by 0.37 inch."[1]

The general habits of Rieffer's Hummingbird are very similar to those of our better-known species. The nests differ somewhat in make-up; of the two specimens before me, both taken by Mr. Charles W. Richmond, on December 24, 1892, and January 16, 1893, the first was saddled on the end of a small, drooping twig of an alligator pear tree, 4½ feet up, the nest being partly supported by the ends of a bunch of leaves. The base of this nest is constructed of bits of dry grass, and the walls of shreds of fine vegetable fiber. The outer walls of this specimen are well covered with green moss and with a few bits of lichens, the whole being securely fastened with spider webs. The inside is lined with soft, brownish down. The structure is a neat piece of bird architecture, and contained two broken eggs when found. It measures 1½ inches in outer diameter, and the same in height. The inner cup measures seven-eighths of an inch in width by three-fourths of an inch in depth. The base of the second specimen is composed of shreds of rotten wood fibers; the walls are built up of apparently similar but finer material, and they are very sparingly covered with shreds of green moss, but more profusely with small pellets of white plant down, held in place by spider webs, while the interior is lined with fine vegetable down. This nest resembles specimens of the Black-chinned Hummingbird somewhat, but is considerably larger. The outside measurements are the same as those of the preceding, but the inner cup is somewhat more roomy; the outer walls are thinner and the cavity is shallower; it was fastened to a fork of a drooping bamboo twig hanging about 4 feet above the water of a creek. It contained two nearly fresh eggs on January 16, 1893; these are now in the United States National Museum collection. They resemble the eggs of our better-known Hummingbirds, both in shape and color; and measure 13.46 by 9.14 and 13.72 by 8.64 millimetres, or 0.53 by 0.36 and 0.54 by 0.34 inch.

The type specimen, No. 25813 (not figured), from a set of two eggs, was taken by Mr. Charles W. Richmond on January 16, 1893, from the last described nest, on the Escondido River, near Bluefields, Nicaragua, and it would appear as if this species actually nested in nearly every month of the year.

[1] The Auk, Vol. IX, 1892, p. 325.

## 80. Amazilia cerviniventris Gould.

BUFF-BELLIED HUMMINGBIRD.

*Amazilius cerviniventris* Gould, Proceedings Zoological Society, 1856, 150.
(B —, C —, R 346, C 420, U 439.)

Geographical range: Valley of the lower Rio Grande in Texas; south through eastern Mexico to Nicaragua, Central America.

The Buff-bellied Hummingbird was also added to our fauna by Dr. James C. Merrill, United States Army, who took the first specimen within our borders on the military reservation of Fort Brown, Texas, on August 17, 1876. Since then it has been ascertained to be quite a common summer visitor in the lower Rio Grande Valley, and a number of its nests have been taken there. It arrives in southern Texas about April 1, and returns south in the latter part of September or the beginning of October. It is one of our plainest-colored Hummingbirds, and its general habits, food, etc., are undoubtedly similar to those of the better-known members of this family found in the United States.

Dr. James C. Merrill says: "The Buff-bellied Hummingbird proves to be an abundant summer visitor, and I have nowhere found it so abundant as on the military reservation at Fort Brown. Here it seems perfectly at home among the dense, tangled thickets, darting rapidly among the bushes and creeping vines, and is with difficulty obtained. A rather noisy bird, its shrill cries usually first attract one's attention to its presence. A Hummer's nest, undoubtedly made by this species, was found in September, 1877, within the fort. It was placed on the fork of a dead, drooping twig of a small tree on the edge of a path through a thicket; it was about 7 feet from the ground, and contained the shriveled body of a young bird. The nest is made of the downy blossoms of the tree on which it is placed, bound on the outside with cobwebs, and rather sparingly covered with lichens. Internally, it is somewhat less than 1 inch in depth by one-half inch in diameter. The external depth is 1½ inches."[1]

I have eight of these nests before me, all taken in Cameron County, Texas, which are readily distinguishable from those of other species breeding in the United States whose nests are known. They are composed of shreds of vegetable fiber, thistle down, and an occasional specimen is lined with a vegetable substance resembling brown cattle hair; but the majority are lined with thistle down. The outside is covered with bits of dry flower blossoms, shreds of bark, and small pieces of light-colored lichens, securely fastened in place by spider webs. The nests are neatly built, and are usually saddled on a small, drooping limb, or placed on a fork of a horizontal twig, at distances of from 3 to 8 feet from the ground. Small trees or bushes of the Anachuita (*Cordia boissieri*) ebony and hackberry seem to furnish their favorite nesting sites, though occasionally a nest is found in a willow. An average-sized nest measures 1⅜ inches in outer diameter by 1¼ inches in height; the inner cup is seven-eighths

[1] Proceedings United States National Museum, Vol. I, 1878, pp. 149, 150.

of an inch in width by five-eighths of an inch in depth. Open woods and the edges of chaparral thickets near roads or paths seem to be preferred for purposes of nidification. Probably two broods are raised in a season. The earliest nesting record I have is April 23; the latest, June 16. The eggs resemble those of our better-known Hummers in color and shape, and appear rather small for the size of the bird.

The average measurement of eighteen specimens in the United States National Museum collection is 13.23 by 8.57 millimetres, or about 0.52 by 0.34 inch. The largest egg measures 14.22 by 8.89 millimetres, or 0.56 by 0.35 inch; the smallest, 12.19 by 8.64 millimetres, or 0.48 by 0.34 inch.

The type specimen, No. 26800 (not figured), from a set of two eggs, Ralph collection, was taken near Brownsville, Texas, on May 9, 1892.

## 81. Basilinna xantusi (Lawrence).

XANTUS'S HUMMINGBIRD.

*Amazilia xantusi* Lawrence, Annals Lyceum, New York, 1860, 109.
*Basilinna xanthusi* Elliott, Classification and Synopsis of the Trochilidæ, March, 1879, 227.

(B —, C 273, R 347, C 407, U 440.)

Geographical range: Southern Lower California, north to about latitude 29°.

Xantus's Hummingbird appears to be confined to the southern half of the peninsula of Lower California, where it was first discovered by Mr. J. Xantus in the fall of 1859. It was described by Mr. George N. Lawrence in April, 1860, who named it in honor of its discoverer. Mr. Xantus did not communicate anything regarding the general habits of this species, and nothing further was learned about it until Mr. L. Belding visited the same regions and obtained its nests and eggs, in the spring of 1882. According to this gentleman, it is a mountain-loving species, in winter frequenting the canyons in close proximity to water, while in summer it is distributed through the orchards and gardens, where it nests.

Mr. Walter E. Bryant, in his "Catalogue of Birds of Lower California," states: "I have found them only in mountainous country where there was abundance of water, from Comondu as far north as latitude 29°. None were seen on the islands."[1]

Mr. Belding, in speaking of this species, says: "It was common at the western base of Cacachiles Mountains in February; more so, in fact, than *Calypte costæ*. It was not observed at San Jose until some time after my arrival, though it occurred in canyons only 2 or 3 miles to the westward. About the last of April it was common in orchards at San Jose. While incubating this species is very confiding and courageous, sometimes remaining upon the nest until removed from it by the hand. A nest taken April 23, 1882, at San Jose,

[1] Proceedings of the California Academy of Sciences, second series, Vol. II, 1889, pp. 289, 290.

was placed underneath an awning or shade of boughs and weeds in front of a farmhouse. It was surrounded by downy heads of composite plants, and could scarcely be distinguished from them, having, as usual, been made of raw cotton."

This nest, which is now before me (No. 18563, United States National Museum collection) is composed exteriorly of fine plant fibers, thistle down, and shreds of moss, and these are securely fastened into place by spider webs; the interior is lined with thistle down and raw cotton; it measures about $1\frac{3}{4}$ inches in outer diameter by 1 inch in height. The inner cavity is large for the size of the nest, measuring 1 inch in width by one-half inch in depth. The second nest, No. 18564, taken by Mr. Belding on May 7, 1882, in a canyon near Santiago Peak, Lower California, resembles the nest of the Black-chinned Hummingbird somewhat, being principally composed of plant down, covered on the outside with a few scales of buds, seed capsules, fine shreds of bark fiber, leaf stems, and an empty cocoon, and these decorations are fastened with spider webs, while the inner cup is lined with plant down and other fine fibrous material. This nest was saddled on the fork of a small twig. Its dimensions are about the same as those of the first nest described, and like it is rather shallow.

The eggs resemble those of our better-known Hummingbirds in shape and color. The two taken from the first nest measure respectively 12.19 by 7.87 and 11.94 by 7.87 millimetres, or 0.48 by 0.31 and 0.47 by 0.31 inch; and those of the second nest, 11.94 by 8.13 and 12.19 by 7.87 millimetres, or 0.47 by 0.32 and 0.48 by 0.31 inch.

The type specimen, No. 18564 (not figured), from a set of two eggs, was taken by Mr. L. Belding on May 7, 1882, near Santiago Peak, Lower California, as already stated.

## 82. Basilinna leucotis (Vieillot).

WHITE-EARED HUMMINGBIRD.

*Trochilus leucotis* Vieillot, Encyclopédie Méthodique II, 559.
*Basilinna leucotis* Boie, Isis, 1831, 546.

(B —, C —, R —, C —, U 441.1.)

Geographical range: Table-lands of Mexico and Central America; north in the United States to the higher mountain ranges in southern Arizona; south to Nicaragua, Central America.

This handsome Hummingbird has only very recently been added to our fauna, Dr. A. K. Fisher obtaining a specimen on June 9, 1894, in the Chiricahua Mountains, in southeastern Arizona. In writing of this capture he says:

"During the early part of June a camp was made at Fly Park, a well-wooded area southeast of the head of Pinery Canyon, at an altitude of about 10,000 feet. A boreal honeysuckle (*Lonicera involucrata*) grows commonly through the scattered woods of spruce (*Picea engelmanni*), fir (*Pseudotsuga taxifolia*), pine (*Pinus ayacahuite*), and aspen (*Populus tremuloides*). The flowers of the honeysuckle attract great numbers of Hummers, and hundreds of *Selas-*

*phorus platycercus* and many *Eugenes fulgens* and *Cæligena clemenciæ* were seen daily about the clumps. Early on the morning of June 9, in company with Mr. Fred. Hall Fowler, the writer saw a female *Basilinna leucotis* sitting on a dead twig of a *Lonicera* bush, close to the ground, warming itself in the rays of the rising sun. The white stripe on the side of the head was plainly visible, and led to its speedy capture. Subsequently others were looked for, but none were seen."[1]

Messrs. Salvin and Godman say: "This is one of the commonest and most characteristic of the Hummingbirds of the highlands of Mexico and Guatemala, its range extending from the States of Sonora and Tamaulipas to the uplands of Nicaragua, birds from these widely separated districts presenting no appreciable difference. Its range in altitude is considerable. It does not occur much below 4,000 feet above sea level, and thence reaches as high as 7,000 or 8,000 feet. On the slopes of the Volcan de Fuego we used to find it not uncommonly in open glades of the oak forests, where it took its food from any plants that happened to be in flower. Of the breeding habits of this species we have no account, but a three parts grown bird from Sierra de Victoria was shot by Mr. Richardson in April; so that the nesting time in that district would commence in March or the end of February. But the nesting season probably extends over a considerable period, for De Oca says he once found a nest in December, though the usual nesting time in the Valley of Mexico, where the bird is more common than at Jalapa, is in July and August. According to Villada it feeds from the flowers of *Cacti* and *Agave*, and also from those of *Bouvardia* and *Salvia*."[2]

I have been unable to find a detailed description of the nest and eggs of this species, and there are no specimens in the United States National Museum collection.

## 83. Iache latirostris (Swainson).

BROAD-BILLED HUMMINGBIRD.

*Cynanthus latirostris* Swainson, Philosophical Magazine, 1827, 441.
*Iache latirostris* Elliott, Classification and Synopsis of the Trochilidæ, March, 1879, 235.
(B —, C —, R 348, C 421, U 441.)

Geographical range: Mountains of southern Arizona and southwestern New Mexico; south to the Valley of Mexico and Michoacan, Mexico.

The Broad-billed or Circe Hummingbird appears to be a moderately common summer resident in suitable localities in southern Arizona and southwestern New Mexico, at altitudes from 3,500 to 5,000 feet. It was first added to our fauna by Mr. H. W. Henshaw, who took two adult males in the Santa Rita Mountains, a few miles from old Camp Crittenden, Arizona, on August 23, 1874. Since then it has also been taken by Mr. F. Stephens in the same locality, where he secured five specimens, which are now in Mr. William Brewster's collection.

[1] The Auk, Vol. XI, 1894, p. 325-326.
[2] Biologia Centrali Americana, Aves, Vol. II, July, 1892, pp. 313, 314.

In speaking of their habits he says: "They were always found near water, and usually along the streams which flowed through canyons, high among the mountains. They seemed to prefer sycamores to other trees, and invariably perched on dead twigs where they could command an open view. Their notes were flat, and differed from those of other Hummers."[1]

Mr. W. E. D. Scott subsequently extended its range northward to the Santa Catalina Mountains. In his notes on the birds of Arizona he makes the following remarks about this species:

"During the spring, summer, and early fall of 1884 this was a rather common species in the Catalina Mountains, from an altitude of 3,500 to 5,000 feet, but in the corresponding season of 1885 the birds were apparently rare. The birds arrive at this point early in April, the 5th of that month being my earliest record, when I took two adult males. They remain throughout the spring and summer, leaving from the middle to the last of September. I took an adult female on June 26, 1884, that contained an unlaid egg, with shell nearly formed, so that there can be little doubt that the birds breed at this point. Besides, I have the young birds in first plumage from July 1 until late in August."

There are also a number of specimens of this species in the United States National Museum collection, taken by Mr. E. W. Nelson in the Santa Rita Mountains and near Tucson, Arizona; and Dr. Edgar A. Mearns took a specimen in a canyon of the Guadalupe Mountains, in southwestern New Mexico, close to the international boundary line, on August 31, 1893, and another on the Santa Cruz River, west of the Patagonia Mountains, near the Sonora line, on July 4, 1893, both of which are now in the collection here.

Dr. A. K. Fisher failed to find this species in the Chiricahua Mountains, Arizona, in the spring of 1894, but it undoubtedly occurs there also. There is a nest of this species, No. 17890, in the United States National Museum collection, taken by Prof. A. Dugès at Guanajuato, Mexico, and received from him in July, 1879, which measures $1\frac{1}{2}$ inches in outer diameter by $1\frac{3}{4}$ inches in height. The inner cup measures 1 inch in width by three-fourths of an inch in depth. For a Hummer's nest it is composed of rather coarse materials throughout. These consist of fine shreds of bark and plant fibers, mixed with a little finer vegetable down; the outside is decorated with narrow strips of bark, fine plant stems, bits of lichens, and a piece of white cotton thread, these materials being covered with a coating of spider webs, which hold them securely in place. The inner lining consists of finer materials of a similar nature, and the entire nest is rather loosely put together. This nest was saddled on a fork of a slender and drooping twig.

Messrs. Salvin and Godman mention another specimen, stating: "Señor A. Herrera describes a nest of this species which he found at Chimalcoyoc, in the Valley of Mexico, as composed of the seeds of *Asclepias linaria*, and placed in a plant of an *Opuntia* in such a manner that a section of the plant shaded it from sun and rain."[2]

[1] Bulletin Nuttall Ornithological Club, Vol. VII, 1882, p. 211.

[2] Biologia Centrali Americana, Aves, Vol. II, May, 1892, pp. 257, 258.

There are no eggs of this species in the United States National Museum collection, and I have been unable to find a description or measurements of the same; but they undoubtedly resemble those of our smaller Hummers very closely.

## Family COTINGIDÆ. Cotingas.

### 84. Platypsaris albiventris (Lawrence).

XANTUS'S BECARD.

*Hadrostomus albiventris* Lawrence, Annals Lyceum, New York, VIII, 1867, 475.
*Platypsaris albiventris* Ridgway, Manual of North American Birds, 1887, 325.
(B —, C —, R —, C —, U 441.1)

Geographical range: Western and southern Mexico; south to Yucatan. Casually north to the southern border of the United States in southern Arizona.

Xantus's Becard, the only representative of this family in the United States, claims a place in our fauna from the fact that a single specimen, an adult male, was taken by Mr. W. W. Price in southern Arizona, close to the Sonora line. Mr. Price makes the following remarks on this subject:

"On June 20, 1888, I secured an adult male, in breeding plumage, of this species, in the pine forests of the Huachuca Mountains, at an elevation of about 7,500 feet, and 7 miles north of the Mexican boundary. (See Ridgway's 'Manual of North American Birds,' p. 325.) I am certain there were a pair of these birds, as I heard their very peculiar notes in different places at the same time; but the locality being so extremely rough and broken, I only secured the one above recorded. Several times while collecting at high altitudes I have heard bird notes that I thought were these, but they were always on almost inaccessible mountain sides. Their note reminds one of the song of Stephens's Vireo (*Vireo huttoni stephensi*), but is not so long continued and is harsher. From observing the actions of the bird I killed, I am sure its mate was in the vicinity, and probably nesting, although I have since carefully searched the place without success. This species will doubtless be found breeding in Arizona, as was *Trogon ambiguus*."[1]

From the fact that no other specimens of this species have been taken in that vicinity, which has since then been visited by several good collectors, I am inclined to believe that this bird can only be considered as a very rare summer visitor in southern Arizona. The late Col. A. J. Grayson met with this species at Mazatlan, where he obtained a male in February, and Mr. J. Xantus also found it on the plains of Colima, Mexico.

Messrs. Salvin and Godman do not recognize this as a good species, and place it under the older name of *Hadrostomus aglaiæ* (Lafresnaye), stating however: "This species, taken as a whole, is subject to a great amount of variation, not only as regards the intensity of the color of the back and under surface, but

[1] The Auk, Vol. V, 1888, p. 425.

also as regards to the rosy spot on the throat, etc." Further on, in speaking of the habits of *H. aglaiæ*, they say: "In all parts of our region the range in altitude of this species is very considerable, and extends from the sea level to an altitude of at least 8,000 feet. In the Tres Marias Grayson found it only in thick woods, where it was seen searching for insects, sometimes darting after them when on the wing, at other times looking for them among the leaves and branches, not unlike the Warblers. Its notes are feeble and but seldom uttered, and its habits are solitary. This island bird has been separated by Mr. Ridgway as *Platypsaris insularis*.

"Mr. Robert Owen found a nest of this bird on May 15, 1860, at Chuacusin, Guatemala, and sent us the female, its nest, and two eggs. The nest was entirely composed of tendrils, strips of bark, and grass, so as to form a hanging nest, open at the top and about 2 inches deep. It was built between and hung from the forked branch of a sapling at the foot of a mountain. The egg is white, beautifully marked with pencilings of pinkish red and scattered spots of the same color; these markings are much blended and concentrated at the larger end."[1]

There is nothing recorded as yet regarding the nesting habits and eggs of Xantus's Becard; but they are not likely to differ very much from the nest and eggs of *Hadrostomus aglaiæ*, to which it is closely allied. As far as I can learn the eggs still remain unknown.

## Family TYRANNIDÆ. Tyrant Flycatchers.

### 85. Milvulus tyrannus (Linnæus).

FORK-TAILED FLYCATCHER.

*Muscicapa tyrannus* Linnæus, Systema Naturæ, ed. 12, I, 1766, 325.
*Milvulus tyrannus* Bonaparte, Geographical and Comparative List, 1838, 25.
(B 122, C 240, R 302, C 366, U [442].)

Geographical range: From northern Patagonia north through South and Central America to southern Mexico and the Lesser Antilles. Within the United States accidentally in Mississippi, Kentucky, New Jersey, and southern California.

The Fork-tailed Flycatcher can only be considered an accidental straggler within our borders. It is a common bird throughout the more level and open portions of Central America, and also throughout the greater part of South America.

The Scissor-tail Tyrant, or "Tijereta," as this species is called by Sclater and Hudson, "is migratory, and arrives, already mated, at Buenos Ayres at the end of September, and takes its departure at the end of February in families, old and young birds together. In disposition and general habits it resembles the

[1] Biologia Centrali Americana, Aves, Vol. II, December, 1890, pp. 121–124.

true Tyrant-birds, but differs from them in language, its various chirping and twittering notes having a hard, percussive sound, which Azara well compares to the snapping of castanets. It prefers open situations, with scattered trees and bushes, and is also partial to marshy grounds, where it takes up a position on an elevated stalk to watch for insects, and seizes them in the air, like the Flycatcher. It also greedily devours elderberries and other small fruits.

"The nest is not deep, but is much more elaborately constructed than is usual with the Tyrants. Soft materials are preferred, and in many cases the nests are composed almost exclusively of wool. The inside is cup-shaped, with a flat bottom, and is smooth and hard, the thistle down with which it is lined being cemented with gum. The eggs are four, sharply pointed, light cream color, and spotted, chiefly at the large end, with chocolate. In the breeding time these Tyrants attack other birds approaching the nest with great spirit, and and have a particular hatred to the *Chimango*, pursuing it with the greatest violence through the air, with angry notes, resembling in sound the whetting of a scythe, but uttered with great rapidity and emphasis. How greatly this species is imposed upon by the Cow-bird, notwithstanding its pugnacious temper, we have already seen in my account of that bird.

"The Scissor-tails have one remarkable habit; they are not gregarious, but once every day, just before the sun sets, all the birds living near together rise to the tops of the trees, calling to one another with loud, excited chirps, and then mount upward like rockets to a great height in the air; then, after whirling about for a few moments, they precipitate themselves downward with the greatest violence, opening and shutting their tails during their wild zigzag flight, and uttering a succession of sharp, grinding notes. After this curious performance they separate in pairs, and, perching on the tree tops, each couple utters together its rattling castanet notes, after which the company breaks up."[1]

Mr. George K. Cherrie, in his List of Birds of San Jose, Costa Rica, speaks of this species as follows:

"Resident, but much more abundant at some seasons than at others—that is, immediately after the breeding season (from the latter part of April until the first of July) they become quite common about the suburbs of the city, and remain so until the middle of December.

"At a slightly lower altitude it nests abundantly. A nest with three fresh eggs, taken by Don Anastasio Alfaro at Tambor, Alajuela, May 2, 1889, was placed in a small tree, about 10 feet from the ground. The parent bird left the nest only very reluctantly and not until almost within the grasp of the collector. The nest is constructed of a mixture of small dry grass and weed stems and soft dry grass, rather compactly woven together, with a lining of a few fine rootlets. It measures outside 5 inches in diameter by $2\frac{3}{4}$ deep; inside, $2\frac{1}{4}$ in diameter by $2\frac{1}{4}$ deep. The eggs are white, sparsely spotted and blotched, chiefly about the larger end, with chestnut of slightly varying shades. In form the

[1] Argentine Ornithology, Vol. I, pp. 160, 161.

eggs are ovate, and they measure 0.88 by 0.66, 0.88 by 0.65, and 0.89 by 0.63 inch" (equal to 22.35 by 16.76, 22.35 by 16.51, and 22.61 by 16 millimetres).[1]

There are no eggs of this species in the United States National Museum collection, and I have been unable to obtain a fully identified specimen for illustration.

## 86. Milvulus forficatus (Gmelin).

SCISSOR-TAILED FLYCATCHER.

*Muscicapa forficata* Gmelin, Systema Naturæ I, i, 1788, 931.
*Milvulus forficatus* Swainson, Classification of Birds, II, 1827, 225.
(B 123, C 241, R 301, C 367, U 443.)

Geographical range: From Nicaragua, Central America, north through eastern Mexico and in the United States, regularly through Texas and the Indian Territory to southern Kansas. Occasional in southwestern Missouri, western Arkansas, and Louisiana. Accidental in Florida, Virginia, Illinois, New Jersey, the New England States, Manitoba, and even north to York Factory, Hudson Bay, and the Mackenzie River Valley, Northwest Territory, Dominion of Canada.

The Scissor-tailed, also known as "Swallow-tailed," Flycatcher, and more frequently as the "Texan Bird of Paradise," is a common summer resident throughout the greater portion of Texas and the Indian Territory, and extends its breeding range northward into southern Kansas. It usually arrives in the southwestern portions of Texas about the middle of March, and returns to its winter homes in Central America in October. Mr. W. E. Grover, of Galveston, Texas, informs me that some of these birds remain in that vicinity throughout the year, moving about from place to place in small of flocks from five to six, and occasionally as many as a dozen may be seen together. Its breeding range is coincident with its distribution in the United States.

The Scissor-tailed Flycatcher is the most graceful and attractive species of this family found within our borders, and is certain to be noticed by everyone wherever it occurs. Its long outer tail feathers, which it can open and close at will, and its pinkish flanks make it a conspicuous object among the Texan birds. In all of its movements on the wing it is extremely graceful and pleasing to the eye, especially when fluttering slowly from tree to tree on the rather open prairie, uttering its twittering notes, which sound like the syllables "psee-psee" frequently repeated, and which resemble those of the Kingbird, but are neither as loud nor as shrill; again, when chasing each other in play or anger, in swift flight from tree to tree, when it utters a harsh note like "thish-thish." It is essentially a bird of the more open country, and shuns extensive timbered tracts, although it is frequently observed on the outskirts of these. It rarely lights on the ground, and its long tail makes it then appear rather awkward in its movements. Although included among the Tyrant Flycatchers, it is rather amiable and social in disposition; and after the birds are once mated several

[1] The Auk, Vol. IX, 1892, pp. 251 and 322.

pairs may frequently breed close to each other, apparently in perfect harmony. It rarely molests or chases birds which are smaller than itself, but boldly attacks Hawks, Ravens, Crows, Jays, and other marauders with the utmost fury, when they come too close to its nesting site.

The Scissor-tailed Flycatcher is rather restless, and rarely remains in one place for any length of time. It is constantly on the lookout for passing insects, nearly all of which are caught on the wing and carried to some perch, where they are beaten into suitable pieces and swallowed at leisure. Its food consists principally of moths, butterflies, beetles, grasshoppers, locusts, and cotton worms; while berries of various kinds are also eaten to some extent. Considered from an economic point of view, they are among our most useful birds, and, as they are rarely molested, they seem to be steadily increasing in numbers, being far more common in many parts of Texas today than they were twenty years ago. They do not begin housekeeping at once after their arrival from their winter quarters in Central America, but dally for several weeks in courting and love-making and having a good time generally before they begin their more serious duties of reproduction. They are not hard to please in the selection of a suitable nesting site, and almost any tree standing by itself is preferred to a more secluded situation

Mr. H. P. Attwater, of Aransas County, Texas, writes me as follows on this subject: "The bold, fearless character of the Scissor-tail is shown in the manner in which he builds his nest, which is a bulky structure, generally placed on a horizontal limb in an exposed position, and his careless disposition is also well exemplified by his choosing for materials anything that comes handy, frequently leaving long pieces hanging from the nest. I have found nests lined with feathers, and others with horse and cow manure."

They nest by preference in mesquite trees, less frequently in live and post oaks, the thorny hackberry or granjeno (*Celtis pallida*), the huisache (*Acacia farnesiana*), honey locust, mulberry, pecan, and the magnolia, as well as in various small, thorny shrubs. Their nests are placed at various distances of 5 to 40 feet from the ground, but on an average not over 15 feet, and often in very exposed situations, where they can readily be seen. Occasionally, when placed in trees whose limbs are well covered with long streamers of the gray Spanish moss, or in shrubs overrun with vines, they are rather more difficult to discover. As these birds are rarely molested, they become quite tame, and nest not infrequently in gardens and in close proximity to the ranches.

Nests of this species from different localities vary greatly in size and materials from which constructed. The base and sides of the nest are usually composed of small twigs or rootlets, cotton and weed stems (those of a low floccose, woolly annual, *Evax prolifera* and *Evax multicaulis*, the former growing on dry and the latter on low ground, being nearly always present); in some sections the gray Spanish moss forms the bulk of the nest, in others raw cotton, and again sheep's wool; while rags, hair, twine, feathers, bits of paper, dry grass, and even seaweeds may be incorporated in the mass. One that I consider

a typical nest, is now before me; it is externally constructed of fine rootlets, mixed with stems of *Evax multicaulis*, which are well worked into the outer walls. The inner cup of the nest is lined with fine plant fibers, with a little wool, and a few feathers. This nest is symmetrical in outline and compactly built; it was securely fastened on the forks of a small oak limb, and was presented to the United States National Museum collection by Mr. H. P. Attwater, Rockport, Texas. Externally it measures 6 inches in diameter by $2\frac{3}{4}$ in depth; its inner diameter is 3 inches by 2 in depth. Other nests in the collection are much more loosely constructed and fully twice as bulky, due no doubt to the character of the materials used in their construction; and again, some birds are much neater and better builders and housekeepers than others.

A nest taken by Dr. E. A. Mearns, United States Army, on April 29, 1893, from an oak tree situated on the edge of the parade ground at Fort Clarke, Texas, is mainly composed of strong cotton twine, mixed with a few twigs, weed stems, and rags; even the inner lining consists mostly of twine. How the female managed to use this without getting hopelessly entangled is astonishing. The previous season's nest still remained in the same tree, and a considerable quantity of twine entered also into its composition. The earliest nesting record I have is April 19, at Brownsville, Texas, where fresh eggs have also been found as late as July 6; and it appears more than probable that two broods are raised in many instances, at least in the southern portions of their breeding range. After the nest, which is constructed in about a week, is ready for occupancy, an egg is deposited daily until the clutch is completed; this usually consists of five eggs, occasionally of four or six. Incubation lasts about twelve days, and the female appears to perform this duty alone, while the male remains in the vicinity, and promptly chases away every suspicious intruder who may venture too close to the nest. The young are fed exclusively on an insect diet, and are able to leave the nest in about two weeks. Both parents assist in their care. In the late summer they congregate in considerable numbers in the cotton fields and open prairies preparatory to their migration south.

The shell of the egg of the Scissor-tailed Flycatcher is smooth to the touch, strong, compact, and moderately glossy. The eggs are usually clear white, occasionally pale creamy white, and rarely of a very pale pinkish ground color. The markings consist of claret brown, heliotrope purple, and lavender spots, and elongated blotches, varying in size and abundance in different specimens; the larger end of the egg is generally the heaviest spotted; but few of these eggs can be called heavily marked, and occasionally a specimen is found which is almost immaculate, the few markings on it being confined to the larger end only. In shape they vary from an ovate to a rounded ovate.

The average measurement of one hundred and seven eggs in the United States National Museum collection is 22.51 by 16.96 millimetres, or about 0.89 by 0.67 inch. The largest egg of the series measures 23.88 by 18.29 millimetres, or 0.94 by 0.72 inch; the smallest, 20.32 by 15.49 millimetres, or 0.80 by 0.61 inch.

Of the type specimens, No. 25574 (Pl. 1, Fig. 12), from a set of six eggs, Ralph collection, was taken near Brownsville, Texas, on April 20, 1892, and measures a trifle above the average size, while No. 26292 (Pl. 1, Fig. 13), from a set of four eggs, taken June 5, 1893, near Rockport, Aransas County, Texas, by Mr. H. P. Attwater, represents one of the least marked and smallest specimens in the series.

## 87. Tyrannus tyrannus (Linnæus).

KINGBIRD.

*Lanius tyrannus* Linnæus, Systema Naturæ, ed. 10, I, 1758, 94.
*Tyrannus tyrannus* Jordan, Manual of Vertebrates, ed. 4, 1884, 96.
(B 124, C 242, R 304, C 368, U 444.)

Geographical range: Temperate North America, chiefly east of the Rocky Mountains; rarer and more locally distributed westward, in portions of Utah, Idaho, Nevada, eastern California, Oregon, Washington, and southern British Columbia; north in the eastern British Provinces to about latitude 50°, and from Manitoba westward to about latitude 57° north; south in winter through central and western South America to Bolivia, the Island of Cuba, and the Bahamas.

The Kingbird, also called "Bee Bird" and "Bee Martin," is a common summer resident, and breeds throughout all of our Eastern and Middle States, and the southern portions of the Dominion of Canada, from Nova Scotia and adjacent regions, south of about latitude 50°, and west to about longitude 90°, whence it ranges north through Manitoba and Saskatchewan into Athabasca, beyond latitude 57°. In the South it breeds from Florida and the Gulf Coast to eastern Texas, but not nearly as commonly as in the Middle and Northern States. Thence it ranges in a northwesterly direction through the Indian Territory and Kansas to the eastern slopes of the Rocky Mountains, where it is rarely found at higher altitudes than 7,000 feet. It enters through some of the lower passes of these mountains into Utah, Idaho, Nevada, Oregon, Washington, and British Columbia, where in certain localities it is not uncommon. I believe it has not yet been observed in northwestern Texas, New Mexico, or Arizona; and in California it can only be considered as a straggler. While a few winter in southern Florida and the Gulf Coast, the bulk of these birds migrate south into Central America, and some even into Bolivia, as well as to the Island of Cuba and the Bahamas. They leave the northern portions of their range about the middle of August, and linger in the south for some weeks before passing our borders.

Few of our birds are better known throughout the United States than the Kingbird. Bold and fearless in character, yet tame and confiding in man, often preferring to live in close proximity to dwellings, in gardens and orchards, they are prime favorites with the majority of our farming population, and they well deserve their fullest protection. Few birds are more useful to the farmer; their reputation for pugnacity and reckless courage is so well established that

it is almost needless to dwell on it, as it is well known that they will boldly attack and drive off the largest of our Raptores, should one venture too near to their chosen nesting sites. Where a pair or more of these birds make their home in the vicinity of a farmhouse, the poultry yard is not likely to suffer much through feathered marauders at least; they are a perfect terror to all hawks, instantly darting at and rising above them, alighting on their shoulders or necks, and picking away at them most unmercifully until they are only too willing to beat a hasty retreat. The male is seemingly always on the lookout from his perch on the top branches of a tree or post for such enemies, and no matter how large they may be, a pair of Kingbirds is more than a match for any of them, our larger Falcons and Eagles not excepted. Crows and Blue Jays seem to be especially obnoxious to them, and instances are on record where they have done them material injury.

From the foregoing it must not be assumed that our Kingbirds are generally quarrelsome and that they bully all other birds, as this is by no means the case. As a rule they live in perfect harmony with all their smaller relatives, and some of the latter's nests are not infrequently placed within a few feet of one of theirs, in the same tree, like that of the Orchard Oriole, for instance; and they are not content with protecting their own young and eggs, but watch over those of their neighbors as well. The only species I have observed as being on bad terms with the Kingbird is our little Ruby-throated Hummingbird, which is well known to be, if possible, even more aggressive and pugnacious than the former, and it would seem as if, small though he may be, he is a match for the average Kingbird, and probably always the aggressor. I have on two occasions seen a Ruby-throated Hummingbird put the other to flight.

They arrive in our Southern States from their winter homes about the first two weeks in April, and move gradually northward, generally making their appearance in the more northern States about the middle of May. The return migration from the far north commences in the beginning of August, and from our Northern States usually in the latter part of this month. While by no means uncommon in many localities west of the Rocky Mountains, here this species is rather irregularly distributed, and while fairly abundant in certain sections, it is entirely absent in others which seem equally well adapted to it. I found the Kingbird rather common on the Malheur and John Day rivers, in Grant County, Oregon, while in closely adjacent sections (as in the vicinity of Camp Harney) I failed to observe a single specimen. I also met with it on Snake River, near old Fort Boise, Idaho. It appears to me to be gradually extending its range westward, and in Washington and southern British Columbia it already reaches the Pacific coast in places.

The Kingbirds are rather noisy on their first arrival in the spring, and give free vent to their exuberance of spirits; they are very restless at this time, now hovering or fluttering slowly from one tree to another, or from fence post to fence post, the male following his mate with a peculiar, quivering movement of the wings and expanded tail, uttering at the same time a succession of shrill,

twittering notes like "pthsee, pthsee," varied now and then with other calls which are rather difficult to express in print; one of these sounds like "twip-ip-ip-ip." Occasionally their flight is apparently accomplished without perceptible movement of the wings, as if gliding along in the air, and again they speed away with the swiftness of an arrow in pursuit of an insect or an enemy, doubling on it with the greatest ease. The males are especially pugnacious during the mating season, and fierce combats ensue between rivals for the possession of the coveted female; but after they are mated they rarely fight among themselves, but quickly come to each other's assistance against a common enemy.

From the observations made in the United States Department of Agriculture, about 90 per cent of the food of this species consists of animal matter, principally beetles, grasshoppers, butterflies, spiders, wild bees, wasps, and millipeds; to this list can be added caterpillars, different species of flies, like the large black gadfly, so annoying to horses and cattle during the summer months, and small minnows. The greater portion of the food is taken on the wing, although it feeds also to some extent on the ground. The bird may usually be seen perched on a low limb of a solitary tree or bush in a pasture, on a fence post, a telegraph wire along some country road, or even on a weed stalk in a field, whence it darts after any passing insect. The snapping together of its mandibles after catching its prey can be heard quite a little distance away. With a few bee keepers the Kingbird does not stand in the best repute, as it is supposed to destroy many bees; but I believe that the damage done in this respect is greatly exaggerated, and on closer examination I am of the opinion that very few working bees will be found among the contents of their stomachs, and that the majority taken by them are drones, which do not store honey, and that the bee keeper is actually benefited by their destruction. The vegetable matter found in their stomachs consists mainly of sassafras and spicebush berries, wild chokecherries, juniper and dogwood berries, mulberries, blackberries, huckleberries, elderberries, pokeberries, and frost grapes. In southern Louisiana, Mr. E. A. McIlhenny tells me, the Kingbird feeds extensively on the berries of the prickly ash and Tabasco peppers, becoming a great nuisance on the pepper plantations. The flesh becomes quite pungent from this food; the bird is considered a delicacy there, and numbers are shot and command a good price in the local markets. It gathers in large flocks in the fall, and is locally known there as "Gross Grasset." The indigestible portions, like the wing covers of beetles, the legs of grasshoppers, and seeds of berries, are ejected in pellets. The Kingbird loves a rather open country, and is rarely found nesting at any great distance from water, and it shuns densely timbered tracts.

In the more southern sections of its breeding range nidification begins usually in the first half of May, while in northern New York and our Northwestern States it rarely nests before June, more generally in the latter part of this month, and still later in the extreme northern parts of its range. The nests are placed in various kinds of trees, such as apple, pear, tulip, chestnut, elm, poplar, cottonwood, willow, oak, sycamore, osage orange, cedar, maple, birch,

hawthorn, locust, wild plum, orange, and lemon, as well as in shrubs and bushes of different kinds, generally at a distance of from 4 to 40 feet from the ground. They are usually placed in a fork or crotch on a horizontal branch, and frequently well out on the limb. They are not at all particular in the selection of a nesting site; I have seen nests placed on a fence rail (sometimes on top of one) and again between the rails not over 2 feet from the ground, in the hollow tops of stumps, and in abandoned nests of the Robin and the Bronzed Grackle. Dr. A. K. Fisher informs me that at Red Cloud, Nebraska, on July 3, 1893, a female was found sitting on a nest placed on top of a fence post, near the railroad track. It is not evident why this site was chosen, as plenty of trees grew in the vicinity. There was no shelter above to protect the nest from the sun, and when seen the female was panting from the heat.

Mr. Elmer T. Judd, of Cando, North Dakota, writes: "A pair of these birds were noticed building a nest on a sulky plow, and after the nest was nearly completed the plow was required and used, but the nest was not disturbed. On finishing the work I put the plow back in about the same place, and after a day or two of consideration the birds finished the nest, laid their eggs, and raised a brood of young. Two little girls used to visit the place every day, and the bird would almost let them put their hands on it before leaving the nest. In this section they usually lay our eggs, and the earliest date of nesting is June 29; the latest, the third week in July. Their favorite nesting sites here are in wild plum bushes, from 4 to 6 feet from the ground, and I have also noticed them nesting in eave troughs and binders."

The Kingbird, like many other species, after selecting a suitable nesting site and raising its young unmolested, will generally return to it from year to year. The nest is usually well and compactly built, and varies more or less in size and bulk, according to the site. A typical nest now before me, taken by Dr. Edgar A. Mearns, United States Army, near Fort Snelling, Minnesota, measures about $5\frac{1}{2}$ inches in outer diameter by $3\frac{1}{4}$ inches in depth; its inner diameter is 3 inches by $1\frac{3}{4}$ inches deep. Its exterior is constructed of small twigs and dry weed stems, mixed with cottonwood down, pieces of twine, and a little hair. The inner cup is lined with fine dry grass, a few rootlets, and a small quantity of horsehair. In other specimens bits of wool, strips of bark, thistle down, cattle hair, and fine rootlets are incorporated in the body of the nest. In the South the gray Spanish moss frequently forms the bulk of the outer walls, while in the Adirondack mountains, in Herkimer County, New York, in June, 1892, Dr. Ralph and the writer took a nest of this species from a crotch formed by the trunk and two broken branches of a small dead birch stump, about 8 feet from the ground, which was externally constructed of the long, green tree moss of that region, mixed with a few fine roots and twigs, milkweed down, weeds, and grasses, and lined with fine roots, hair, milkweed down, a little tree-moss, *Ursnea*, and a few blades of fine grass. The stump stood by itself on the edge of a small swamp, and the nest could be plainly seen for some distance. Mr. E. A. McIlhenny tells me that in the willow swamps in southern Louisiana these birds

construct their nests entirely out of willow catkins, without any sticks whatever, and that the nests can be squeezed together in the hand like a ball.

The male assists in the construction of the nest, and to some extent in the duties of incubation. He relieves the female from time to time to allow her to feed, guards the nesting site, and is usually perched on a limb close by, where he has a good view of the surroundings. Even when so engaged he rarely sits entirely quiet, but every few minutes elevates his crest and looks around for a possible enemy. An egg is deposited daily, and incubation lasts from twelve to thirteen days. The young while in the nest are fed entirely on animal food and are able to leave it in about two weeks after hatching, and soon learn to provide for themselves. A second brood is occasionally raised in the more southern portions of their breeding range.

The Kingbird is not particularly sociable, each pair keeping pretty much to themselves during the breeding season, and later in family parties, until the winter migration commences, when they gather in flocks and depart for the south.

Three or four eggs are laid to a set; in some localities three seems to be the rule. This is especially the case in the more southern portions of their breeding range, while farther north they generally lay four. Although the Kingbird is credited by several writers as laying from three to five eggs, and sometimes even six, I have never seen a larger set than four among the many examined, and sets of even five eggs must be considered as very unusual. The ground color of these eggs varies from white or pale creamy white to a very faint rose pink, and they are spotted and blotched with chestnut, claret brown, cinnamon, rufous, heliotrope purple, and lavender. The markings vary greatly, both in size and quantity, but are generally heaviest about the larger end of the egg. In the more finely marked specimens the spots are usually more profuse and evenly distributed, and occasionally an almost unmarked egg is found. The shell is rather smooth, close-grained, moderately strong, and slightly glossy. The eggs are mostly ovate in shape, ranging from this to short and rounded ovate, and a few are elongate ovate.

The average measurement of one hundred and forty eggs in the United States National Museum collection is 24.06 by 18.21 millimetres, or about 0.95 by 0.72 inch. The largest egg of the series measures 26.92 by 19.30 millimetres, or 1.06 by 0.76 inches; the smallest, 20.83 by 17.27 millimetres, or 0.82 by 0.68 inch.

The type specimen, No. 22299 (Pl. 1, Fig. 14), from a set of four eggs taken by Mr. Denis Gale, near Gold Hill, Boulder County, Colorado, on June 25, 1884, shows one of the less marked examples; and No. 25052 (Pl. 1, Fig. 15), from a set of three eggs taken by Dr. Edgar A. Mearns, United States Army, near Fort Snelling, Minnesota, on June 13, 1890, represents a well-marked specimen.

## 88. Tyrannus dominicensis (Gmelin).

GRAY KINGBIRD.

*Lanius tyrannus β. dominicensis* Gmelin, Systema Naturæ, I, 1788, 302.
*Tyrannus dominicensis* Richardson, Report Sixth Meeting of the British Association, V, 1837, 170.

(B 125, C 243, R 303, C 369, U 445.)

Geographical range: West Indies, coasts of Carribean Sea, and Gulf of Mexico; north to Florida, Georgia, and South Carolina. Accidental in Massachusetts and British Columbia.

The Gray Kingbird is a moderately common visitor to and breeds along the southern border of the United States, and its habitat is mainly confined to the immediate vicinity of the seacoast and the banks of the larger streams flowing into the Gulf of Mexico. Audubon, who called this bird the Pipiry Flycatcher, reported it as quite common on most of the Florida Keys, and Dr. Bachman observed a pair breeding in the college yard at Charleston, South Carolina, which returned for at least three years in succession and raised two broods in a season.[1] Mr. Arthur T. Wayne took a nest and eggs of this species on Sullivan Island, near Charleston, South Carolina, in June, 1893. Mr. C. J. Maynard found them rather common on some of the Florida Keys, and writes about them as follows: "The Gray Kingbirds appear to prefer the outer or higher keys, and visit them in great numbers, especially during the spring migration. In order to give some idea of the home of these birds, I will describe Bamboo Key, where I found them particularly common. This little island, which contains nearly 2 acres of land, lies about midway between Key West and Cape Florida. It is one of a line of outer keys which have an old coral reef for a foundation, and as the present reef, which extends parallel with the keys, but which lies 5 miles at sea, is clearly visible, this is used as a wrecking station, and has a lookout erected on it. There were two families living there; but, with the characteristic improvidence of the poorer class in Florida, they did not attempt to cultivate the soil, choosing rather to depend upon a precarious livelihood gained by wrecking. Thus the vegetation of the place was, in a great degree, in a primitive condition. Nearly the whole key was surrounded by a belt of mangroves, but these grew on very low ground, over which the tide rose every day; higher on the dry land were bushes, among which two or three species of cacti grew in profusion, and as the whole was overgrown by a tangled mass of vines it formed an impenetrable thicket. The wreckers had formed a small clearing in the midst of this jungle and erected two or three wretched houses.

"I landed on the 1st of May, and remained there several days, during which time I saw hundreds of Gray Kingbirds. They appeared to be migrating, for numbers were constantly arriving from seaward; yet, unlike many other species, they invariably came in pairs, and were evidently mated, as they were constantly pursuing each other through the air in a playful manner, at the same

[1] History of North American Birds, 1874, Vol. II, p. 320.

time vociferating loudly. They exhibit a decided preference for mangroves, and later, by the middle of the month, build their nests in them, usually selecting bushes which overhang the water. These birds inhabit all of the higher keys from Key West to Cape Florida. They also occur on the west coast in suitable localities, but I do not think that they are as abundant on the east side of the peninsula. They must migrate early, as I never found them in autumn."[1]

Mr. W. E. D. Scott says: "The earliest record I have of its arrival about Tarpon Springs, Florida, is April 23, 1887, and the birds are common till late in September. The eggs are laid in this vicinity from about the middle to the last of May, and but one brood appears to be reared."

Mr. Atkins' notes are as follows: "Arrives at Punta Rassa middle of April; nests commonly on the islands and along the shore in mangrove bushes; seems to prefer an isolated tree or bush near the water. Last noted at Punta Rassa September 13. Arrives at Key West about April 11. A few breed here."[2]

First Lieut. Wirt Robinson, Fourth Artillery, United States Army, found this species not at all uncommon at Matanzas Inlet, Florida, and took three sets of eggs, which are now in the United States National Museum collection, on May 18 and 23, 1894. Here they nested in the low mangroves.

The Gray Kingbird is far more abundant in the West India Islands, especially in Cuba, Jamaica, Dominica, and the Bahamas, where it is one of the most conspicuous birds. Its general habits, food, and manner of flight appear to be very similar to those of our common Kingbird, and, like it, it is fearless and pugnacious in the defense of its chosen nesting site, boldly attacking birds much larger than itself.

Mr. Richard Hill, of Spanish Town, Jamaica, in some interesting notes furnished to Mr. Gosse, says: "The Jamaica bird is not exclusively an insect feeder, but eats very freely of the sweet wild berries, especially those of the pimento. These ripen in September, and in groves of these this bird may always be found in abundance. By the end of September most of the migrant birds have left the island. * * *

"This is among the earliest of the birds to breed in Jamaica. As early as January the mated pair is said to be in possession of some lofty tree, sounding at day dawn a ceaseless shriek, which is composed of a repetition of three or four notes sounding like 'pe-chee-ry,' from which they derive their local name. * * * In feeding, just before sunset, they usually sit eight or ten in a row, on some exposed twig, darting from it in pursuit of their prey, and returning to it to devour whatever they have caught. They are rapid in their movements, ever constantly and hurriedly changing their positions in flight. As they fly they are able to check their speed suddenly and to turn at the smallest imaginable angle. At times they move with motionless wings from one tree to another. When one descends to pick up an insect from the surface of the water, it has the appearance of tumbling, and, in rising again, ascends with a singular motion

[1] Birds of Florida and eastern North America, 1881, p. 176.
[2] The Auk, VI, 1889, p. 318.

of the wings, as if hurled into the air and endeavoring to recover itself. * * * This Flycatcher is also charged by Mr. Hill with seizing upon the Hummingbirds as they hover over the blossoms in the gardens, killing its prey by repeated blows struck on the branch and then devouring them."[1]

In Florida nidification rarely commences before the third week in May, and sometimes not before June. The nests are most frequently found in mangrove bushes, in different species of palms, and less often in live oaks; they are usually placed on horizontal limbs overhanging the water, and at no great distance above it. A nest now before me, taken by Lieut. Wirt Robinson, at Matanzas Inlet, on May 18, 1894, measures 6 inches in outer diameter by $2\frac{1}{4}$ inches in depth; its inner diameter is 4 inches by $1\frac{1}{4}$ in depth. It is externally composed of small twigs and rootlets, and lined with finer material of the same kind. It is a very loosely and carelessly built structure, resembling a Mourning Dove's nest more than anything else; it contained four fresh eggs when found. The number of eggs to a set varies from three to four, although it is said that occasionally as many as five are found. These are among the handsomest of our Flycatchers; their ground color varies from a creamy to a pinkish or flesh-colored tint, and they are profusely spotted and blotched with different shades of chocolate, burnt umber, claret brown, mixed with lighter shades of lavender and heliotrope purple, the markings are usually heaviest about the larger end of the egg, and often form an irregular wreath. The shell is close grained and rather firm; the shape is usually elliptical ovate, less often elongate ovate.

The average measurement of a series of forty eggs in the United States National Museum collection is 25.91 by 18.50 millimetres, or about 1.02 by 0.73 inches The largest egg of the series measures 27.68 by 19.30 millimetres, or 1.09 by 0.76 inches; the smallest, 22.61 by 17.53 millimetres, or 0.89 by 0.69 inch.

The type specimen, No. 16844 (Pl. 2, Fig. 3), was taken by Mr. N. B. Moore, near Manatee, Florida, in June, 1873, and represents a well-marked specimen, while No. 20405 (Pl. 2, Fig. 4), Bendire collection, taken by Mr. C. H. Nauman, in May, 1875, in southern Florida, represents an average-marked egg of this species.

## 89. Tyrannus melancholicus ouchii (Baird)

COUCH'S KINGBIRD.

*Tyrannus couchii* Baird, Birds of North America, 1858, 175.
*Tyrannus melancholicus* var. *couchii* Coues, Check List, ed. I, Dec., 1873, 51.
(B 128, 129, C 246, R 305, C 372, U 446.)

Geographical range: From Guatemala north through Mexico, to the lower Rio Grande Valley, in southern Texas.

Couch's Kingbird is a common summer resident throughout a considerable portion of Mexico, but within our borders it appears to be rather rare, and has so far only been observed in the lower Rio Grande Valley, where it breeds spar-

[1] History of North American Birds, 1874, Vol. II, pp. 321, 322.

ingly. I have been quoted in the "History of North American Birds, 1874" (Vol. II, p. 329), as having taken this subspecies near Tucson, Arizona; this is evidently a mistake, as I can not find any reference to such a capture among my notes on Arizona birds.

For what little we know about Couch's Kingbird we are indebted to Mr. George B. Sennett, who first met with it on May 8, 1877, at Lomita Ranch, near Hidalgo, Texas. He says: "At this point is the finest grove of ebonies (*Acacia flexicaulis*) I saw on the river. On the hillside, back of the buildings, they overlook the large resaca, then filled with tasseled corn. It was the tops of these grand old trees that these Flycatchers loved, and so persistent were they in staying there that I thought they were going to settle in the neighborhood for the season. There was a company of some six or eight scattered about. I did not find them shy, for after our firing they would almost immediately return to the same trees. They were readily distinguishable from *Tyrannus carolinensis*, which were shot in their company; their greater size and bright yellow under parts can be seen at gunshot range."[1]

A nest taken by one of Mr. Sennett's collectors in 1881 is described by him as follows: "The nest was situated some 20 feet from the ground, on a small lateral branch of a large elm, in a fine grove not far from the houses of the ranch. It is composed of small elm twigs, with a little Spanish moss and a few branchlets and leaves of the growing elm intermixed. The sides of the nest are lined with fine rootlets; the bottom with the black, hair-like heart of the Spanish moss. The outside diameter is 6 inches and the depth 2 inches. The inside diameter is 3 inches and the depth 1.25 inches."[2]

There is as yet but little known about the general habits, food, and call notes of this subspecies; but it is presumable that they do not differ very materially from those of the other members of this family. The number of eggs varies from three to four, and the nests appear generally to be placed near the end of a horizontal limb, on a good-sized tree, at no very great distance from the ground, and preferably near water.

All the eggs of this subspecies in the United States National Museum collection were taken in the vicinity of Brownsville, Texas, where these birds usually commence nesting during the first two weeks in May.

The ground color of the eggs is a delicate creamy pink, and they are moderately well blotched and spotted with chocolate, claret brown, heliotrope purple, and lavender. These markings are, in some instances, scattered pretty evenly over the entire surface of the egg; in others they are mainly confined to the larger end. They are readily distinguishable from the eggs of the balance of our Kingbirds by their peculiar ground color, while their markings are very similar to those found on the eggs of the other species of this family. The shell is close-grained and rather strong, and in shape the eggs are generally ovate or elongate ovate.

[1] Bulletin of the U. S. Geological and Geographical Survey, 1878, Vol. IV, No. 1, p. 31.
[2] The Auk, Vol. I, 1884, p. 93.

The average size of thirteen eggs in the United States National Museum collection is 24.38 by 18.45 millimetres, or about 0.96 by 0.73 inch. The largest egg measures 24.89 by 18.80 millimetres, or 0.98 by 0.74 inch; the smallest, 23.62 by 17.53 millimetres, or 0.93 by 0.69 inch.

The type specimens, Nos. 24313 and 26345 (Pl. 2, Figs. 5 and 6), both from the Ralph collection, were obtained near Brownsville, Texas, the former on May 13, 1891, the latter on May 16, 1893, and show the different styles of markings.

## 90. Tyrannus verticalis Say.

ARKANSAS KINGBIRD.

*Tyrannus verticalis* Say, Long's Expedition, II, 1823, 60.
(B 126, C 244, R 306, C 370, U 447.)

Geographical range: Western North America; from the Pacific coast east to western Texas, western Indian Territory, middle Kansas, Nebraska, and western Minnesota; north to North Dakota, southern Assiniboia, Alberta?, and southern British Columbia; south to Lower California, and in the winter through Mexico to Guatemala. Accidental in Iowa, Maine, New Jersey, New York, and Maryland.

The Arkansas Kingbird, for which the name of "Western Kingbird" seems to be better suited, is pretty generally distributed as a summer resident throughout the middle and western portions of the United States, and it breeds in suitable localities throughout these regions. The northern limit of its breeding range extends, as far as is at present known, into southern Assiniboia (the valley of the Souris River), and probably westward through southern Alberta, as well as along the southern borders of British Columbia, where it appears to be fairly common, excepting in the immediate vicinity of the coast. In the United States it reaches its northern limits in North Dakota and southern Minnesota, where it is rare, and thence it is found south through Nebraska, middle and western Kansas, western Indian Territory to northwestern Texas, and in all of the intervening regions westward to the Pacific Ocean.

In Lower California the Arkansas Kingbird appears to be rare, though a few breed in the northern portions of this peninsula. Dr. Edgar A. Mearns, United States Army, found a nest of this species at St. Ysidora ranch on July 2, 1894, containing three eggs, which are now in the collection here. This species arrives from its winter home in Mexico and Guatemala, along the southern border of its breeding range, about the latter part of March, and passes leisurely northward, reaching our more northern States about the beginning of May, and returning early in September. By the middle of October all, or nearly all, have passed our borders, and I do not believe that any winter within the United States.

The Arkansas Kingbird is pretty generally distributed throughout most of our Western States, and is especially abundant in the Great Basin region. It is essentially a bird of the more open country, especially of the river valleys, and is not generally found in the higher mountain systems, where it rarely reaches higher altitudes than 7,500 feet. I have observed this species as common in

southern Arizona as in northern Washington and Idaho, and wherever water and a few willows are to be found, no matter if the surrounding country may otherwise be a perfect desert, some of these birds are sure to be seen. This Flycatcher is, if anything, more noisy than our common eastern Kingbird, and utters also a greater variety of notes; some of these resemble the squeaking sounds of our Grackles; others are indifferent efforts at song—a low, warbling kind of twitter—while occasionally it gives utterance to shrill, metallic-sounding notes with more force to them than those of the Kingbird. During the mating season they are especially noisy, and begin their love songs, if they may be called such, at the earliest dawn, and keep up their concerts with but slight intermission during the greater part of the day; but after they are mated and nidification commences they are more quiet.

Mr. R. H. Lawrence writes me from Monrovia, California, that the Arkansas Flycatcher also utters very peculiar notes at times during the night. He says: "On the night of July 30, 1893, I frequently heard a queer cry; sometimes only a single note, and again this was repeated three or four times, followed by a crying or wailing sound, as if made by a very young kitten. I heard these notes on successive nights. On August 2, about 4.30 a. m., I succeeded in shooting the performer out of a pepper tree standing close to the house, and it proved to be an Arkansas Flycatcher."

The males precede their mates a few days in the migration, and as soon as the latter arrive constant quarrels between rivals for the favors of the coveted female ensue. Frequently half a dozen of these birds may be seen chasing each other about, pecking at and tumbling over each other in mid-air, keeping up an incessant chatter and scolding in the meantime; but very rarely have I seen feathers fly during these ostensible combats, and I am inclined to think that the majority of such performances are indulged in more in fun than in anger. They are undoubtedly more social than the common Kingbird, as I have seen two pairs nesting in the same tree, apparently living in perfect harmony with each other. While they are by no means devoid of courage, they appear to me to be much less quarrelsome on the whole than the former, and they are far more tolerant toward some of the larger Raptores. For instance, in the vicinity of Camp Harney, Oregon, I found a pair of these birds nesting in the same tree (a medium-sized pine) with Bullock's Oriole and Swainson's Hawk, and, as far as I could see, all were on excellent terms.

Their food consists of animal matter, principally grasshoppers where these are abundant, as well as of moths, butterflies, different species of flies, winged ants, caterpillars, and the large black crickets of the West. Most of their prey is caught on the wing, and they rarely fail in capturing it. They are extremely dexterous, and their flight is powerful and swift. During the summer they feed occasionally on wild berries, and among these the service berry seems to be more often eaten than any other. Like our common Kingbird, they are often credited with feeding to a considerable extent on bees, and are therefore in bad repute with bee keepers. This accusation, like many others made about some of our most useful and beneficial birds, seems to be entirely unfounded.

Mr. Walter E. Bryant makes the following remarks relating to this subject in "Zoe" (Vol. IV, 1893, p. 57):

"Mr. A. Barnett, of San Diego County, California, has 300 swarms of bees, which attracted the Flycatchers to such an extent that he made some investigations to ascertain to what degree they might be damaging to the bee industry. Over one hundred Arkansas Flycatchers and Phœbes (Black and Say's) were dissected. In all of the Arkansas Flycatchers only drones were found, but no working bees, although in many cases the birds were gorged. In most of the Phœbes drone bees were also found; the only exception was that of a Phœbe (Say's?) in which a bee sting was found in the base of the tongue. The birds were all shot about apiaries, and were seen darting upon and catching bees. The examinations were made with a hand lens. Mr. Barnett regards the occurrence of the sting found in the Phœbe as accidental, and concluded that Flycatchers are beneficial in reducing the numbers of drones."

The Arkansas Kingbird, like all of our Flycatchers, is extremely beneficial and deserves the fullest protection, and where not molested becomes quite tame and will readily nest about houses. They are not at all particular in the choice of nesting sites and build in various situations, but generally in trees in creek bottoms, near water, though I have occasionally found one of their nests fully a mile away in an isolated tree in the foothills. Cottonwoods and willows seem to be more often selected than other trees, but perhaps only because they are the commonest kinds throughout most of their breeding range. Oaks, sycamores, Australian blue gum, junipers, elms, and orchard trees are also made use of to a certain extent, while pines are rarely occupied.

Mr. William G. Smith informs me that in Colorado they nest occasionally on ledges. Dr. C. T. Cooke writes me that a pair of these birds nested in the summer of 1891 in a church steeple in Salem, Oregon, and Mr. Elmer T. Judd, of Cando, North Dakota, informs me that he found a nest on a beam of a railroad windmill pump, about 6 feet from the ground, where trains passed close by the nest constantly; another was found by him on a grainbinder which was standing within a couple of rods of a public schoolhouse.

I have examined many of their nests in various parts of the West. The majority of these were placed in forks of trees, and generally close to the trunk; others were saddled on horizontal limbs. One nest was placed in the top of a hollow cottonwood stump, the rim of the nest being flush with the top; another pair made use of an old nest of the Western Robin; and still another built on the sill of one of the attic windows of my quarters at Fort Lapwai, Idaho. They probably would not have succeeded in keeping this nest in place had I not nailed a piece of board along the outside to prevent the wind from blowing the materials away as fast as the birds could bring them. They were persistent, however, and not easily discouraged, working hard for a couple of days in trying to secure a firm foundation before I came to their assistance. Both birds were equally diligent in the construction of their home until it was nearly finished, when the female did most of the arranging of the inner lining, and many

a consultation was evidently indulged in between the pair before the nest was finally ready for occupation, a low twittering being kept up almost constantly. It took just a week to build it, and an egg was deposited each morning afterwards until the set, which consisted of four eggs, was completed. After incubation had commenced, I noticed that the female left her eggs for an hour or more at a time, during the middle of the day, when the sun was shining on that part of the house, and sat panting on the window sill or on a little cottonwood tree close by, keeping watch over her treasures. I also observed her turning the eggs over and rearranging them occasionally when she returned to the nest.

The nests of the Arkansas Kingbird vary greatly in bulk and size according to the situation, and are usually placed at no great height from the ground. Generally they are compactly built structures, the foundation and outer walls being composed of weed stems, fine twigs, plant fibers, and rootlets, intermixed with wool, cocoons, hair, feathers, bits of string, cottonwood, milkweed, and thistle down, or pieces of paper, and lined with finer materials of the same kind.

A typical nest, No. 26036, United States National Museum collection, taken by Mr. H. W. Henshaw, near St. Ysabel, California, measures 6 inches in outer diameter by 3 in depth; the inner cup is 3 inches wide by $1\frac{3}{4}$ deep. It is principally composed of the stalks of *Stylocline arizonica* and *Micropus californicus*, mixed and lined with cocoons and a little down.

Nidification, even in the more southern parts of their range, rarely commences much before the middle of May, more generally during June, and near the northern limits not before the first week in July. From three to five eggs are laid to a set, four being the usual number. I have taken two sets of five each near Fort Walla Walla, Washington, but such large sets are rather rare. Incubation lasts from twelve to thirteen days; this duty is mostly performed by the female, but I have also seen the male on the nest, and he can generally be observed close by, on the lookout for danger. Both parents are exceedingly courageous in the defense of their nest and young, and every bird of this species in the neighborhood will quickly come to the rescue and help to drive intruders off as soon as one gives the alarm. The young grow rapidly and are able to leave the nest in about two weeks. They consume an immense amount of food, certainly fully their own weight in a day. I have often watched the family previously referred to, raised on the sill of my attic window, and also fed them with the bodies of the large black crickets while one of the parents was looking on, and apparently approvingly, within a few feet of me. I have stuffed them until it seemed impossible for them to hold any more, but there was no satisfying them; it certainly keeps the parents busy from early morning till late at night to supply their always hungry family. They are readily tamed when taken young, and are very intelligent, making interesting pets. I believe that only one brood, as a rule, is raised in a season, excepting possibly in the extreme southern portions of their range, in southern Arizona and California, as I found fresh eggs on Rillito Creek, near Tucson, as late as July 20, in a locality where these birds

had not been previously disturbed, which seems to indicate that they occasionally may rear a second brood.

The eggs of the Arkansas Kingbird do not differ in shape or coloration from those of the Kingbird, and the same description will answer for both; but they are a trifle smaller as a rule.

The average measurement of one hundred and four eggs in the United States National Museum collection is 23.62 by 17.42 millimetres, or about 0.93 by 0.69 inch. The largest egg of the series measures 25.91 by 18.54 millimetres, or 1.02 by 0.73 inches; the smallest, 19.81 by 15.75 millimetres, or 0.78 by 0.62 inch.

One of the type specimens, No. 20392 (Pl. 1, Fig. 16), from a set of three eggs, shows rather heavy and handsome markings, and also a slightly pinkish ground color, while No. 20399 (Pl. 1, Fig. 17), from a set of four (one of the largest specimens in the series) represents about an average-marked egg; both are from the Bendire collection; the former was taken at Fort Lapwai, Idaho, June 16, 1871, and the latter at Fort Walla Walla, Washington, May 25, 1881.

## 91. Tyrannus vociferans Swainson.

CASSIN'S KINGBIRD.

*Tyrannus vociferans* Swainson, Quarterly Journal of Science, XX, 1826, 273.
(B 127, C 245, R 307, C 371, U 448.)

Geographical range: Western United States; from the eastern slopes of the Rocky Mountains west to California; north to southern Wyoming; south through Colorado, New Mexico, northwestern Texas, Arizona, to Lower California, Mexico, and in winter to Guatemala and Costa Rica. Accidental in Oregon.

Cassin's Kingbird, while fairly common in certain sections of its range, appears to be entirely absent in some of the intermediate regions. Eastward, so far as is known at present, its breeding range extends to the eastern bases of the Rocky Mountains in Colorado, and possibly to southeastern Wyoming, where Dr. C. Hart Merriam obtained a single specimen on May 27, 1872, near Cheyenne. In the Great Basin region, through Utah and Nevada to the eastern slopes of the Sierra Nevadas in California, it has not yet been met with, but it probably occurs in southern Utah; while in the coast districts of southern California and through the greater portion of Arizona and New Mexico it is a common summer resident, and it also probably breeds in limited numbers in northwestern Texas. In Oregon it can only be considered as a straggler, though Mr. A. W. Anthony observed a few specimens on May 5, 1885, in Washington County, in the northwestern part of the State. While the Arkansas Kingbird appears to shun the immediate coast districts, Cassin's Kingbird seems to prefer them. It is said to be quite common in many parts of Mexico during the breeding season, and in southern California it is partly resident.

Mr. F. Stephens writes me: "Cassin's Kingbird is a winter resident in southern California, but it is not very common. I have failed to find them here during the breeding season, even in the mountains."

It has not as yet been reported from southern Arizona as a winter resident. I failed to notice them after October in the vicinity of Tucson, and believe they migrate regularly, returning from their winter homes in the south in March.

Cassin's Kingbird is neither as noisy nor as quarrelsome as the preceding species, and appears to be more of a mountain-loving bird and to nest at higher altitudes.

Dr. Edgar A. Mearns, United States Army, in his notes on Arizona Mountain Birds, says: "Cassin's Kingbird breeds commonly throughout the pine forests. I found it in the uppermost timber on San Francisco Mountain in June, the altitude being nearly 12,000 feet. This conspicuous species likewise breeds in the low valleys of Arizona, together with the Arkansas Kingbird (*Tyrannus verticalis*), nests of both species having been found at the same time in one cottonwood tree in the Verde Valley. On the Mogollon Mountains I saw them attack Crows and Western Red-tailed Hawks, and drive them from the neighborhood of their nests after the spirited fashion of the eastern Kingbird."[1]

Their food, like that of the other members of this family, consists principally of insects, and is obtained in a similar manner.

Their call notes do not differ very much from those of the other Kingbirds, but on the whole are perhaps less shrill and a trifle more melodious. While they are possibly more common in the oak and pine belts in Arizona, I found them by no means rare in the lowlands along the Santa Cruz River and Rillito Creek, near Tucson, Arizona, during the summer of 1872, where I took a number of their nests. I consider them very late breeders, my earliest record being June 14, when I took a set of four fresh eggs; but it is possible that I may have overlooked the first broods entirely, as most all the nests found by me during the month of June (about a dozen) contained fresh eggs. The season of 1872 was a very backward one, however, and this may account for the late nesting, especially as Dr. Cooper is quoted in "History of North American Birds, 1874" (Vol. II, p. 328), as finding Cassin's Kingbird breeding at San Diego, California, as early as March 28. The earliest record I have is May 27, 1892—a set of three eggs containing large embryos, taken at Dog Spring, Grant County, New Mexico, by Dr. E. A. Mearns, United States Army, and now in the United States National Museum collection. This nest was located in a hackberry tree, near a nest of Swainson's Hawk, containing two eggs.

The trees generally selected by this species for nesting sites are pines, oaks, cottonwood, walnut, hackberry, and sycamores, and the nests are almost invariably placed near the end of a horizontal limb, usually from 20 to 40 feet from the ground, in positions where they are not easily reached. All of the nests examined by me were placed in large cottonwoods, with long spreading limbs, and were saddled on one of these, well out toward the extremity. The majority

[1] The Auk, Vol. VII, 1890, p. 255.

could only be reached by placing a pole against the limb and climbing to it. They are fully as demonstrative as the Arkansas Kingbird when their nests are disturbed, and are equally courageous in the defense of their eggs and young. The nests are large, bulky structures, larger than those of the preceding species, but composed of similar materials. An average nest measures 8 inches in outer diameter by 3 inches in depth. The inner cup is $3\frac{1}{2}$ inches wide by $1\frac{3}{4}$ deep. Sometimes they are pretty well concealed to view from below, but they can usually be readily seen at a distance.

From two to five eggs are laid to a set. Sets of three or four are most frequently found, while sets of two and five are rare, but I have found both, incubation having already commenced in the smaller set. This lasts from twelve to fourteen days, and is almost always, if not exclusively, performed by the female. I have never noticed the male on the nest. The eggs are similar in color and markings to those of the Kingbird and Arkansas Kingbird, and about the same size as the latter, but on the whole they are not quite as heavily spotted.

The average measurement of forty-four eggs in the United States National Museum collection is 23.62 by 17.47 millimetres, or about 0.93 by 0.69 inch. The largest egg of the series measures 27.94 by 19.30 millimetres, or 1.10 by 0.76 inches; the smallest 22.61 by 16.26 millimetres, or 0.89 by 0.64 inch.

The type specimen, No. 20413 (Pl. 1, Fig. 18), from the Bendire collection, was taken by the writer on Rillito Creek, Arizona, on July 15, 1872, and is a rather large-sized egg, while No. 26146 (Pl. 1, Fig. 19) was collected by Dr. Edgar A. Mearns, United States Army, on the east side of the San Luis Mountains, New Mexico, on June 17, 1892. The two specimens represent about average-marked eggs of this species.

## 92. Pitangus derbianus (Kaup).

DERBY FLYCATCHER.

*Saurophagus derbianus* Kaup, Proceedings Zoological Society, 1851, 44, Pl. XXXVI.
*Pitangus derbianus* Sclater, Proceedings Zoological Society, 1856, 297.
(B —, C —, R 308, C 364, U 449.)

Geographical range: North to the lower Rio Grande Valley in Texas; south through Mexico and Central America to Colombia, Venezuela, and Trinidad, South America.

The Derby Flycatcher, also locally known as the "Bull-headed Flycatcher," "Mexican Pitangus," and "Rio Grande Flycatcher," can only be considered as a rather uncommon summer visitor in the lower Rio Grande Valley, in southern Texas, where it breeds in very limited numbers, though in the adjoining States of Tamaulipas and Nuevo Leon, in eastern Mexico, it appears to be fairly common, and it is equally so throughout the greater portion of the Mexican Republic, both in hot and temperate zones, where it sometimes reaches an altitude of 5,000 feet. It also breeds throughout Central America in suitable localities.

Mr. G. B. Sennett, to whom we are indebted for a great deal of valuable information about the birds of the lower Rio Grande Valley, added this large and conspicuous Flycatcher to our fauna, and says: "On April 23, 1878, a male and female of this species were shot at Lake San Jose, a few miles from Lomita. Both were shot about 4 feet up on the trunks of small retama trees standing in the water, and were clinging to them and working their way down to the water, possibly to drink. They were not particularly shy. On May 3 another female was shot in a tree bordering the lake, yet not over the water. One or two more were observed in timber about water holes. In flight this Flycatcher resembles the Kingfishers. Dissection indicated the approach of the breeding season, and it undoubtedly nests in the large trees of the locality."[1]

Mr. E. W. Nelson writes me that he found the Derby Flycatcher rather common about reed patches bordering the salt lagoons, near Manzanillo, in Colima, Mexico. They usually perched on the tops of dead bushes or stout reeds, from which vantage points they made excursions in various directions after passing insects. He also met with them near Jalapa, Vera Cruz, where they frequented the scattered bushes on the borders of fields and along streams flowing through cultivated or inclosed lands.

Mr. Charles W. Richmond has kindly furnished the following notes on this large Flycatcher, as observed by him in Nicaragua:

"The name given this bird in Nicaragua refers to its note, which sounds like 'kiskadee,' several times repeated. They have another note, which they utter on some occasions, and also a note of distress, very different from either of the others. Although the food consists of insects, I have seen one specimen that had its mouth and throat full of ripe banana. The Derby Flycatcher is common along the streams, and almost invariably travels in pairs. The bird appears to be evenly distributed along the water courses, and two or three pairs may occupy perhaps a mile along the river front, which territory they go over every day. At the International Planting Company's Headquarters, where I collected for over eight months, there were two pairs on the river, one on each side, and another pair located on a creek close by. After shooting the two pairs on our side of the river, no others came about for a long time, although the pair on the opposite side of the river (about 300 yards wide at this point) passed up and down each day on their rounds. Their flight ordinarily is short, the birds stopping a short time in each place, picking up food as they move along."

The most complete and interesting account of the general habits of the Derby Flycatcher is that published by the late George N. Lawrence, based upon collections and notes on the "Birds of Western and Northwestern Mexico," made by the late Col. A. J. Grayson, and published in the "Memoirs of the Boston Society of Natural History" (Vol. II, p. 286). These are as follows:

"This is a common and abundant species, inhabiting the western and northwestern parts of Mexico; I found it equally as common in Tehuantepec as in the region of Mazatlan, where its loud, shrill notes of 'hip-se-dee, hip-se-dee'

[1] Bulletin of the U. S. Geological and Geographical Survey, Vol. V, No. 3, 1879, pp. 407, 408.

may be heard at all seasons of the year, but more particularly during the breeding season, when it is excessively garrulous. It is more frequently met with in the neighborhood of fresh-water streams and lagoons, and I have often observed them dart into the water after water insects and minnows that were swimming near the surface, not unlike the Kingfisher; but they usually pursue and capture on the wing the larger kinds of *Coleoptera* and *Neuroptera*, swallowing their prey entire after first beating it a few times against their perch. They are usually in pairs, but I have also seen as many as twenty about a stagnant pool, watching its turbid water for insects and small fish, for which they seem to have a great partiality.

"The nest of this species is very large, and its construction differs from all the *Tyrannidæ* of which I have any knowledge excepting *M. texensis*. It is dome-shaped or covered, with the entrance on the side, while the other species build a saucer-shaped nest. The nest of the Bull-headed Flycatcher is usually placed in the forks of the branches of very thorny trees, 25 or 30 feet from the ground. It is composed of very coarse materials, of either straw or lichens, sometimes of both, the lining, however, is of firmer and more elastic fibers. Other birds sometimes make their nests in the same or nearest tree, such as *M. texensis*, *C. melanicterus*, and *I. pustulatus*. The eggs of this Flycatcher are usually five in number; they are of moderate size, rather lengthened, of a light cream color, with a small reddish speck; the shell is delicate and easily broken."

Messrs. Salvin and Godman make the following remarks about this species: "In Guatemala *Pitangus derbianus* builds its nest in April and May; one found at Duenas was a large, loose structure with a great deal of superfluous matter about it, its entrance being on one side; it was composed entirely of small twigs and placed at the end of a branch about 20 feet from the ground; another taken at San Geronimo had two openings, but one seems to be the rule. A favorite haunt is the banana groves, where the nest may be found wedged in among the clusters of fruit. The eggs are slightly pear-shaped, of a pale creamy-white color, spotted and blotched with brick red. They vary considerably in size and color, especially as to the magnitude and density of the spots.

"We never noticed *P. derbianus* feeding on fish and water insects, as described by Grayson, but Mr. Hudson ascribes similar habits to *P. sulphuratus* in the Argentine Republic."[1]

There are three sets of eggs in the Ralph collection, taken in Cameron County, Texas, on May 9, May 27, and June 23, 1893, respectively. Each of these contained four fresh eggs when found; the last set was probably a second laying, the first having been destroyed. Two of these nests were located in a thicket of huisache trees (*Acacia farnesiana*), about 10 feet from the ground; the other in a large bunch of Spanish moss, pending from the limb of a large tree, about 14 feet up. The last-named is now in the collection here. The nest proper is an unusually bulky structure, composed principally of gray Spanish moss, dry weed stems, pieces of vines, and swamp grasses, and lined with finer

[1] Biologia Centrali Americani, Aves, Vol. II, 1889, p. 45.

materials of the same kinds. It measures 11 inches in outer diameter by 5 inches in height. The inner cup measures 5 inches in diameter by 2 inches in depth. The various materials are well interwoven and make a compact mass. The walls of the nest are unusually thick. The other nests were lined with wool, feathers, plant down, and Spanish moss.

The number of eggs to a set is four or five, and probably only one brood is raised in a season. They vary considerably in shape; the majority may be called short ovate, others are ovate and elongate ovate; the shell is close grained and but slightly glossy. The ground color is pale creamy white, and is sparingly spotted, principally about the larger end, with irregularly shaped splashes and minute specks of seal or liver-brown and different shades of lavender.

The average measurement of eighteen eggs in the United States National Museum collection is 29.46 by 21.34 millimetres, or 1.16 by 0.84 inches. The largest egg measures 30.48 by 22.10 millimetres, or 1.20 by 0.87 inches; the smallest, 26.16 by 21.34 millimetres, or 1.03 by 0.84 inches.

The type specimens, Nos. 26342 and 26343 (Pl. 1, Figs. 20 and 21), both from sets of four eggs, Ralph collection, were taken in Cameron County, Texas, on May 27 and June 23, 1893, respectively, and represent the heavier and finer marked types of these eggs.

## 93. Myiozetetes texensis (Giraud).

GIRAUD'S FLYCATCHER.

*Muscicapa texensis* Giraud, Sixteen Texas Birds, 1841, Pl. I.
*Myiozetetes texensis* Sclater, Proceedings Zoological Society, 1859, 56
(B —, C —, R 309, C —, U [450].)

Geographical range: Central America; south to Colombia, South America, north to northern Mexico (and southern Texas?).

Giraud's Flycatcher is included in our fauna on Giraud's Texas record, but no other specimens have since been secured, and if it occurs at all in the lower Rio Grande Valley, in Texas, it can only be considered as an accidental straggler, and it is not probable that it breeds within our borders.

Mr. Charles W. Richmond has kindly furnished me the following notes on this bird: "It is very abundant in Nicaragua. It is confined to the vicinity of water courses, and is evenly distributed in such localities. It is quite a stationary bird; pairs occupying a certain precinct may be found in the same place week after week, seldom wandering far away, according to my observations. The bird usually selects a tree overhanging the water for its perch, where it often sits for a considerable length of time, uttering its peculiar cry, which resembles that of a young chicken, only louder. The bird has other notes which it makes use of at different times. Occasionally it prospects around the outer branches of the tree for insects, making short flights from branch to branch in a leisurely manner, looking carefully about before proceeding to the next branch, and

stretching its neck out, after the manner of a Dove. It frequently flies out from its perch after passing insects, like a Wood Pewee or Kingbird. This bird bathes frequently during the day if the sun is shining, flying down into the water with a splash, then up to its perch again, where it dresses its feathers. This style of bathing I have noticed only in Giraud's Flycatcher.

"The nest is a beautiful structure, roofed over, with the entrance at one side. It is usually profusely covered with living moss, and is generally placed in a bush or tree over the water, from 5 to 15 feet up as a rule. Nests are often placed in bunches of bananas, and I have found them in young lime trees, 4 feet from the ground. One nest, found in a clump of vines, was fully 30 feet from the ground. I found a nest May 13, containing three young birds fully fledged. The parent birds were very much excited while I remained in the vicinity. The species is known as 'Little Kiskadee' by the English-speaking people here, on account of its resemblance to the Derby Flycatcher."

Mr. E. W. Nelson writes me: "I found Giraud's Flycatcher common along tall hedges bordering fields near Jico, Vera Cruz, Mexico, during June and July, 1893. They were also particularly common along streams bordered by a more or less straggling growth of tall bushes. They appeared to nest only in the latter situations—a dozen or more of their nests were found here, all similarly situated. They were placed in forks near the tops of tall, slender, and generally overhanging bushes, from 12 to 15 feet from the ground. In several instances the nests were placed in the tops of bushes overhanging streams. There was not the slightest attempt at concealment, and the nests were usually visible at a considerable distance, appearing like large, ragged handfuls of dry grass thrust carelessly into the forks of the bushes. They were still more conspicuous from the fact that they were usually built in the tops of bushes somewhat taller than the average, or apart from the general mass of surrounding vegetation.

"Unfortunately, all of the nests examined were either occupied by young or had already been deserted; they were all lined with fine grass stems. The old birds were not at all shy, but watched my approach with considerable anxiety, hovering about from the top of one bush to another, in the vicinity of nests containing young, uttering clear, plaintive, whistling notes of alarm, with occasional harsher, chattering cries. When undisturbed these birds perch quietly on conspicuous points, whence they dart off after passing insects or utter occasional mellow, whistling call notes. They are usually rather quiet birds, although always conspicuous from the nature of their surroundings. The upper limit of their range, near Jalapa, Vera Cruz, appears to be about 4,500 feet."

Mr. G. K. Cherrie, of San Jose, Costa Rica, has kindly presented the United States National Museum with a well-preserved nest of this species, and also a handsome set of eggs, the first fully identified specimens in the collection. Since these have been received I find that the late Col. A. J. Grayson had taken the nest and eggs of Giraud's Flycatcher near Mazatlan, Mexico, years previously, and a short but correct description of the nest is given in the Memoirs

of the Boston Society of Natural History (Vol. II, p. 286). An egg taken by him at the time is now in the collection here, and undoubtedly belongs to this species.

Giraud's Flycatcher begins nesting in Costa Rica about the first of April, and probably rears two broods in a season. The set of eggs presented by Mr. Cherrie was taken on June 30, 1890, and was, more than likely from a second laying. This gentleman describes a nest taken by him near Talamanca, Costa Rica, on April 1, 1890, as follows: "It was placed in a thorny shrub, about 5 feet from the ground, the shrub growing in a clearing by the side of a river. It is composed entirely of dry grass, externally of rather coarse stems, and lined with very fine, soft tops. It is somewhat retort shaped, resting in the forks of the limb, but is also bound to one of the branches of the fork for almost the entire length of the nest. Long grass stems hang from the front of the nest for 12 inches below the bottom; the nest measures externally 10 inches in depth by 6 inches in horizontal diameter."

The one sent to the United States National Museum, taken at the same place on April 8, 1890, is similarly constructed; it resembles the nests of our Cactus Wren very much, and might readily be mistaken for one of them.

The eggs are two or three in number, ovate in shape, rather thin shelled, and without luster; their ground color is a delicate creamy white with a faint pinkish tint, and they are sparingly marked, especially about the larger end of the egg, with minute spots of prune and heliotrope-purple and lavender.

The average measurement of five eggs in the United States National Museum collection is 23.11 by 16.76 millimetres, or 0.91 by 0.66 inch. The largest egg measures 25.91 by 16.76 millimetres, or 1.02 by 0.66 inches; the smallest, 21.34 by 16.51 millimetres, or 0.84 by 0.65 inch.

The type specimen, No. 25283 (Pl. 1, Fig. 22), from a set of three eggs, was taken by Mr. George K. Cherrie, near San Jose, Costa Rica, on June 30, 1890, and represents an average-marked egg.

## 94. Myiodynastes luteiventris Sclater.

SULPHUR-BELLIED FLYCATCHER.

*Myiodynastes luteiventris* Sclater, Proceedings Zoological Society, 1859, 42 (ex Bonaparte Compte Rendu XXXVIII, 1854, 657, nomen nudum).
(B —, C —, R 310, C 365, U 451.)

Geographical range: Mexico and Central America; north to southern Arizona; south to Panama.

We are indebted to Mr. W. H. Henshaw for the addition of this handsome Flycatcher to our avifauna. He says:

"This peculiar Flycatcher appears to be a summer resident of the Chiricahua Mountains in southern Arizona, where I obtained a pair of old birds, together with three young, August 24, 1874. These, though indistinguishable in size

and perfection of plumage from the adult pair, were still the objects of their solicitous care, and were dependent upon them for food. Indeed, their presence might have remained unnoticed by me had I not been greeted, as I entered the mouth of one of the deep, narrow canyons intersecting the mountains in every direction, by the shrill notes and angry cries of the old birds, who hovered in the air at a short distance, or flew restlessly from tree to tree endeavoring to distract my attention from the young, till, taking the alarm, they flew over into an adjoining ravine, where soon after I found the whole family assembled, the old birds having immediately rejoined their charges. The following day Dr. Rothrock, while out botanizing, saw what he supposed to be a second family of six or seven of these birds, so that the occurrence of the species here is probably to be regarded as by no means accidental."[1]

Since then Lieut. Harry C. Benson, United States Army, and Dr. A. K. Fisher have both taken this species among the oaks in some of the canyons near Fort Huachuca, and it undoubtedly occurs regularly throughout the mountain regions of southern Arizona during the breeding season. Mr. E. W. Nelson found it not uncommon about Jalapa and Jico, in Vera Cruz, where they were noted during June and July. They were found along hedges bordering the roadsides and fields, and also among bushes on the more open parts of the slopes of hills and canyons. In their general habits they closely resemble *Myiozetetes texensis.*

Mr. Richard D. Lusk has recently sent me the following notes on the nesting of this species in southern Arizona, under date of October 14, 1894. He writes: "After watching every pair of Sulphur-bellied Flycatchers that came to my notice, all through the season, in the hope of discovering some actions that looked like nesting, I had given it up as useless, when, on the morning of August 1, I saw one in the distance fly to a hole in the main stem of a sycamore tree, about 40 feet from the ground. The bird flew first to an outer branch of the tree and made a careful reconnoiter of the vicinity. I waited and watched quietly until the programme was repeated twice, and then, after going close to the tree and ascertaining the hole to be a natural knot hole, came to the conclusion that the bird must be building, for there had been none of the species in that vicinity a few days previous when I remained there for some time hunting. Two weeks later I returned to the tree and succeeded in reaching the hole, after some difficulty. It was about 4 inches in diameter, straight in, scarcely extending below the margin of the entrance, so that the bird, sitting on the eggs, could have easily looked out of the hole. Within was a nest, which, though exceedingly simple in construction, was certainly unique in material of composition, for there was not a vestige of anything in its structure except the stems of walnut leaves, with which the bottom of the hole was lined for a depth of about half an inch.

"Three years ago Mr. O. C. Poling shot a specimen of this species of Flycatcher which had a fully developed egg in its ovary, as late as the last of July,

[1] Geographical Surveys West of 100th Meridian, Vol. V, 1875, p. 347.

and last year, about the middle of July, I shot a female that was obviously laying. I conclude from these circumstances, coupled with my experience this season, that the bird is an exceptionally late breeder, which possibly may account for no one getting on the track of their nests before, as the bird is not very uncommon in some localities in this section. Regarding their notes, I think I have noted but two distinct kinds, their discordant screech and a single call. The screech, it seems to me, is not to be compared to any bird voice I have ever heard, but might perhaps be compared to the protest of a wagon wheel that needs oiling, varying in length, but always of the same incomparable quality of tone. Once heard, it is certain to live in the memory and be recognized even after the lapse of years. I could hardly describe their single note or call without hearing it again. I only know that it does not closely resemble that of any other Flycatcher, though it might not impress one as peculiar in itself, as does their other note. I do not think it is uttered nearly as frequently as the screech.

"They are fully as quarrelsome as the average Flycatcher, at least about their nesting tree, always keeping up their discordant notes while so engaged, though if a man is about they are apt to make themselves scarce. They are much less inclined to seek an exposed, dead branch than some of the other members of this family, and seem to me at least to be much less actively engaged in their legitimate calling of catching flies than any other Flycatcher. Moreover, I have seen them repeatedly flying into wild-cherry trees, loaded with ripe fruit, and though I have not happened to be close enough at the time to see them eating the fruit, I concluded that that was what they were doing. They frequent streams bordered with large trees, seeming always to prefer sycamores, and I have rarely seen one more than 50 yards from a stream. The extreme width and size of their bills, together with their short necks, give them a peculiar appearance even at a distance."

This nest, when taken on August 15, 1894, contained three well incubated eggs, these being the first ones actually found within our borders. They were obtained in Ramsey's Canyon, in the Huachuca Mountains, and are now in the United States National Museum collection.

As the plates for this volume had already been made up and were then in the lithographer's hands, none of them can be figured. They are broad, elliptical ovate in shape; the shell is close-grained, strong, and only slightly glossy. Their ground color is rich, creamy buff, and they are profusely blotched and spotted, principally about their larger ends, with dark pansy purple and lighter shades of lavender; these markings do not resemble the streaky pattern found in the eggs of the genus *Myiarchus*. They measure 27.18 by 19.05, 26.42 by 18.80, and 24.64 by 18.54 millimetres, or 1.07 by 0.75, 1.04 by 0.74, and 0.97 by 0.73 inches.

The specimen figured on Pl. 2, Fig. 7, was kindly loaned by Mr. William Brewster, as there were no eggs of this species in the collection at the time the plates were made up. It was taken by Mr. R. R. McLeod, near Carmen, Chihuahua, Mexico, on May 26, 1885, from a cavity in a tree.

It resembles the eggs previously described in shape and ground color, but the markings are somewhat brighter and lighter colored, and it measures only 24.89 by 19.56 millimetres, or 0.98 by 0.77 inch. The female parent, No. 23643, Brewster collection, was secured at the same time.

## 95 Myiarchus crinitus (Linnæus).

CRESTED FLYCATCHER.

*Muscicapa crinita* Linnæus, Systema Naturæ, ed. 12, I, 1766, 325.
*Myiarchus crinitus* Lichtenstein, Nomenclator Museo Berolinensis, 1854, 16.
(B 130, C 247, R 312, C 373, U 452.)

Geographical range: Eastern United States; north to the Provinces of New Brunswick, Quebec, Ontario, and Manitoba, Dominion of Canada; west to Minnesota, eastern Nebraska, eastern Kansas, eastern Indian Territory, and slightly beyond the eastern half of Texas; south in winter through eastern Mexico to Panama and Colombia, South America.

The Crested or Great Crested Flycatcher is a common summer resident in suitable localities throughout the eastern United States, and breeds from Florida and the Gulf Coast northward, including the southern portions of the Dominion of Canada. The western limit of its breeding range in Texas extends somewhat beyond the eastern half of the State into Tom Green County, and thence in a northeasterly direction to Minnesota and southern Manitoba. While the majority of these birds pass beyond our borders in winter, not a few remain on the Florida peninsula and the adjacent keys throughout this season, probably birds from the extreme northern portions of their breeding range. The majority reenter the United States between March 25 and April 10, moving leisurely along, and usually arriving on their breeding grounds in the Middle States about the latter part of April, and correspondingly later farther northward. In northern New York and thence west to Minnesota they are rarely noticed before the middle of May. The return migration from their breeding grounds in the extreme northern limits of their range commences in the latter part of August, and few of these birds remain into September.

The Crested Flycatcher, though not particularly rare along our northern border, is far more common in our Middle and Southern States, though perhaps not as often observed as its abundance would warrant. Its characteristic call notes may generally be heard in any piece of woods containing some dead timber and situated not too far from water. During the mating season it is one of the noisiest of our Flycatchers, and its loud, ringing call notes can be heard quite a distance. It utters a variety of sounds; the most common is a clear whistle like "e-whuit-huit," or "wit-whit, wit-whit," repeated five or six times in a somewhat lower key, and varied to "whuir, whuree," or "puree," accompanied by various turnings and twisting of the head. Its alarm note is a penetrating and far-reaching "whēēk, whēēk," and it took me some time to make sure that it was made by this species. I had previously attributed it to a Shrike; but one

morning, while making observations, I found a brood of young Crested Flycatchers, barely able to fly, which the parents vainly tried to coax away from the neighborhood, and I identified the makers of this note fully. The depressed crest was raised while uttering it, and the calls were repeated for minutes at a time, as the young were not inclined to leave the trees they were in.

Mr. J. W. Preston writes me: "I heard a peculiar note of this Flycatcher one evening at sunset. The singer was perched in the top of a tall tree, and along with the ordinary song it uttered a clear, liquid 'bir die-birdie,' with much the same tone and energy of the Cardinal's song."

I consider this Flycatcher much shyer and generally more retiring than other species of this family, like the Kingbird, Wood Pewee, Phœbe, etc., and, although probably equally abundant in some sections as the species mentioned, it is not nearly as often noticed. It appears to me to be rather unsocial in its habits, and one will rarely see more than a pair together excepting during the migrations. From my own observations, I take it also to be more intolerant toward smaller birds generally than other Flycatchers, but not as pugnacious as the Kingbird toward larger birds. Among each other they are rather quarrelsome, and after a pair has selected a nesting site no intruders are allowed to encroach on their range.

The late Colonel Goss says: "They fight fiercely for a mate, and they have a habit that I have not noticed in other birds, of plucking, if possible, the tail feathers of a rival, in order to disfigure him, so that he will not be looked upon with favor by the opposite sex; and when lucky enough to pull a feather, it is amusing to see them fuss over it, picking, pulling, in fact fighting it, forgetting for the time the owner in their exultation over the capture."[1]

Its favorite haunts are the heavily timbered bottom lands along the banks of streams and the borders of timbered tracts contiguous to water, and generally at some little distance from human habitations. Sometimes an exception is found to this rule, and pairs of these Flycatchers have been known to nest in close proximity to dwellings, and even in such artificial nesting sites as martin boxes, etc.

From an economic point of view the Crested Flycatcher must be considered an extremely useful bird. Its food consists mainly of insects, such as beetles, various species of flies, grasshoppers, butterflies, moths, and larvæ, varied in the late summer with wild berries of different kinds. Its flight is strong, swift, and graceful, but rarely protracted. Each bird has a few favorite perches within its range, generally a dead limb near the top of a tree on the edge of a wood, whence it darts after passing insects, which seldom escape capture; these are then carried to the nearest perch and devoured at leisure. I have seen it double in the chase with as much ease as a Falcon, and the sharp snapping of its mandibles indicated plainly that its sudden dash was successful.

Nidification commences ordinarily some two or three weeks after its arrival on the breeding grounds, each pair of birds selecting a suitable nesting

[1] History of the Birds of Kansas, 1891, p. 360.

site, consisting usually of a natural cavity in some tree near the borders of a forest, in an old orchard, or in a dead stump leaning over water, and frequently an abandoned excavation of one of the larger Woodpeckers is used. Natural cavities are preferred, however, where such are obtainable, even should these be much more extensive than are really needed, as instances are known where openings in hollow limbs fully 6 feet deep have been filled up with rubbish to within 18 inches of the top before the nest proper was begun. Both sexes assist in nest-building, and it takes sometimes fully two weeks before their task is completed. The finishing and lining of the nest is generally completed by the female. In Florida and other Southern States nidification begins ordinarily during the first two weeks in May; in the Middle States, in the latter half of this month and the first week in June; and in the more northern portions of its breeding range, rarely before the middle of this month, or not until the weather has become quite warm.

The nests of the Crested Flycatcher vary greatly in bulk and composition according to the localities in which they are placed. The trees most frequently used for nesting sites are old apple or pear trees, different species of oaks, maple, ash, cottonwood, and pines. A nest taken by Mr. J. W. Preston on June 3, 1881, near Eldora, Iowa, from a dead stump about 6 inches in diameter, standing on the banks of the Iowa River, and which filled 8 inches of the cavity, began with a base of coarse trash and was finished with fine twigs, bunches of cattle hair, pine needles, dry leaves and grasses, the tail of a rabbit, pieces of Catbirds' eggshells, exuviæ of snakes, owl and hawk feathers, tufts of woodchucks' hair, and fine grass roots. Another nest, taken by Dr. W. L. Ralph, near San Mateo, Florida, on May 16, 1892, was placed in a hole in the side of a rotten stump in low, flat pine woods, and was composed of dry cypress leaves, pine needles, grasses, sphagnum moss, dead leaves, bunches of hair, snake exuviæ, strips of cypress bark, weeds, grass roots, palmetto fiber, and feathers; it was lined with bunches of hair, feathers, strips of cypress bark, and pieces of snake skin.

Exuviæ of snakes seem to be present in the majority of the nests of this species; they are sometimes incorporated in the nest proper, and again they are placed around the sides of it, in all probability for protective purposes, and are changed and rearranged from time to time. But few nests are found which do not contain more or less of this material, and occasionally whole skins enter into their composition.

Mr. W. E. Loucks, of Peoria, Illinois, writes me: "I found a very remarkable nest of the Crested Flycatcher some years ago. The curious feature about it was that the birds had taken an enormous snake skin, probably that of a blacksnake, and had so arranged it within the entrance of the cavity that the greater part of it hung outside. What other motives could the birds have had than that of alarming intruders? Although usually a bird of the woods, I have found their nests in a summerhouse on a picnic ground. The house was quite large and frequented nearly every day by crowds of people; nevertheless this did not disturb

the birds in the least. They had selected a corner inside under the eaves, and on a shelf-like projection reared their young in perfect safety." I know of an instance where a pair built their nest in the open end of a stovepipe running out from the side of a cabin near Washington, District of Columbia, and also where these birds built in a stack of railroad ties close to the track over which a number of trains passed daily.

The Crested Flycatcher builds at various heights ranging from 2 to 60 feet, but usually not much over 20 feet from the ground. The nesting cavities selected are ordinarily from 18 to 30 inches deep and others are considerably deeper, while occasionally one is quite shallow. The inner cup of the nest varies from $2\frac{3}{4}$ to $3\frac{1}{2}$ inches in diameter and from $1\frac{1}{2}$ to 2 inches in depth.

The eggs vary from four to eight in number, sets of five being perhaps most often found, while those of six are not particularly rare. Mr. J. W. Preston, of Baxter, Iowa, writes me that he took a set of seven eggs on June 6, 1886, from a hollow in a dead limb which had been broken off, and in falling lodged against some small saplings. The eggs were fresh and warmly covered with duck feathers. The oölogical collection in the Academy of Natural Sciences, Philadelphia, Pennsylvania, contains a set of eight eggs, which I have personally examined. The parents are usually not very demonstrative when their nests are disturbed, and but rarely scold at the intruder. As a rule but one brood is reared in a season, and incubation lasts about fifteen days; the female attends to these duties almost exclusively, but is not a very close setter, and it is not uncommon to find addled eggs in the nests of this species. An egg is deposited daily until the set is completed. The young are fed principally on insects of various kinds, and are able to leave the nest in about two weeks; they are cared for by both parents until expert enough to care for themselves.

The eggs of the Crested Flycatcher and those of the remaining members of the genus *Myiarchus* are most peculiarly marked, and differ in this respect from all other North American species, excepting the White-necked Raven, whose eggs resemble these somewhat in the style of markings, but not otherwise. Their ground color varies from creamy to vinaceous buff, and this is overlaid with irregular blotches, longitudinal streaks and scratches, fine hair lines of different shades of claret, liver brown, purple, and lavender, as if done with a pen, giving the egg a unique appearance. In the majority of specimens these markings are heaviest about the larger axis of the egg; in others they are more evenly distributed, and in an occasional set the smaller two-thirds of the eggs are nearly unspotted, and but few streaks and scratches are noticeable, as shown in one of the figured types; but such instances are rare. They are mostly ovate or short ovate in shape, varying occasionally to elliptical or elongate ovate. The shell is close grained, rather firm, and slightly glossy.

The average measurement of ninety-one eggs in the United States National Museum collection is 22.54 by 17.47 millimetres, or about 0.89 by 0.69 inch. The largest egg of the series measures 24.38 by 17.78 millimetres, or 0.96 by 0.70 inch; the smallest, 20.57 by 15.24 millimetres, or 0.81 by 0.60 inch.

The type specimen, No. 20436 (Pl. 2, Fig. 8), from a set of four eggs, Bendire collection, was taken in Black Hawk County, Iowa, June 19, 1876; and No. 26262 (Pl. 2, Fig. 9), also from a set of four, near Richmond, Virginia, June 7, 1879, by First Lieut. Wirt Robinson, United States Army. The first represents one of the heavier, the latter one of the least marked types.

## 96. Myiarchus mexicanus (Kaup).

MEXICAN CRESTED FLYCATCHER.

*Tyr[annula] mexicana* Kaup, Proceedings Zoological Society, 1851, 51.
*Myiarchus mexicanus* Lawrence, Annals Lyceum, New York, IX, May, 1869, 202.
(B 132, C —, R 311, C 374, U 453.)

Geographical range: Lower Rio Grande Valley in Texas; south through eastern and southern Mexico, and in winter to Guatemala and Salvador, Central America.

The Mexican Crested Flycatcher is a common summer resident of the table-lands of eastern and southern Mexico, and reaches the northern limits of its breeding range in the lower Rio Grande Valley, in Texas, beyond which it apparently does not pass, but here it is not at all rare in suitable localities.

Dr. James C. Merrill, United States Army, while stationed at Fort Brown, Texas, first discovered this species as a summer resident of our fauna, and described its nest and eggs in the Bulletin of the Nuttall Ornithological Club (Vol. III, 1878, p. 100), from specimens taken on May 10, 1877. The nest was placed in the end of a broken branch of an anacahuite tree, about 10 feet from the ground. It was made of locks of wool and hairs, and contained five eggs, slightly advanced. He informs me that there is but little difference in the general habits, food, and call notes of this species from those of the better-known Crested Flycatcher of the eastern United States. Like this, it is only a summer resident within our border, arriving in the lower Rio Grande Valley about the beginning of April and returning to its winter home in Central America the latter part of September. It nests mainly in natural cavities in mesquite trees or in old rotten stumps, and occasionally in abandoned holes of some of the larger Woodpeckers, in telegraph poles, and in open woods, from 5 to 20 feet from the ground. The nests, according to Sennett, are composed of a matted felt consisting of soft strips of bark, feathers, hair, and wool, with sometimes bits of snake skins intermingled, but this material is apparently not nearly as generally used by this species as seems to be the case with our eastern bird.

Nidification commences sometimes before the middle of April and lasts through May. The latest date I have is June 5; the earliest, April 18, when a set of five fresh eggs was taken. Probably but one brood is raised in a season. Mr. G. B. Sennett flushed a male from a nest containing six eggs on May 16, 1878, which shows that it assists, occasionally at least, in the duties of incubation. The number of eggs laid to a set varies from four to six, sets of five being most frequently found. They resemble the eggs of the Crested Flycatcher very

closely in size, shape, and style of markings, and can not be positively distinguished from them; on the whole, however, they are not quite so heavily marked, and the ground color is frequently more of a light cream tint than a cream buff.

The average measurement of seventy-seven eggs in the United States National Museum collection is 22.35 by 17.53 millimetres, or 0.88 by 0.69 inch. The largest egg of the series measures 23.88 by 18.29 millimetres, or 0.94 by 0.72 inch; the smallest, 19.81 by 17.02 millimetres, or 0.78 by 0.67 inch.

The type specimens, Nos. 24939 and 25318 (Pl. 2, Figs. 10 and 11), both from sets of five eggs, Ralph collection, were taken near Brownsville, Texas, the former on June 5, 1891, the latter on May 7, 1892, and represent the average and lighter styles of coloration.

## 97. Myiarchus mexicanus magister Ridgway.

ARIZONA CRESTED FLYCATCHER.

*Myiarchus mexicanus magister* Ridgway, Proceedings Biological Society, Washington, II, April 10, 1884, 90.

(B —, C —, R —, C —, U 453*a*.)

Geographical range: Western Mexico; north to southern Arizona and southwestern New Mexico; south in winter to Tehuantepec, Mexico.

The Arizona Crested Flycatcher is the largest representative of the genus *Myiarchus* found within our borders, and its breeding range seems to be confined mainly to the giant cactus belt of southern Arizona, where it appears to be a rather irregular summer resident, not uncommon in some seasons and rare in others. I failed to notice it while collecting in the vicinity of Tucson, in the spring and summer of 1872, and Mr. Herbert Brown, who tried to secure the nest and eggs for the United States National Museum, in 1893, was equally unsuccessful, while Mr. F. Stephens reported them as rather common in the same locality in the latter part of May and throughout June, 1881, securing over a dozen specimens during the time. Mr. William Brewster, in a paper on "A Collection of Arizona Birds," makes the following remarks on this subspecies:

"The collector's notes (F. Stephens) relating to the habits of this Flycatcher are disappointingly brief. It frequented low mesquites, and was tame and rather noisy, having a variety of loud calls, some of which resembled those of *Myiarchus cinerascens*, while others were 'almost Thrasher-like.' Its food seemed to consist largely of beetles. On June 27 a nest was found at Camp Lowell. 'Both parents were distinctly seen and positively identified. The nest was in an old Woodpecker's hole in a giant cactus, about 18 feet from the ground. It was lined with soft, downy weed seeds, and contained two young just hatched and an addled egg.' The egg, unfortunately, is so badly broken that accurate measurements are impossible, but an approximation would be 1.04 by 0.74 inches. In ground color and markings it closely resembles the eggs of *Myiarchus crinitus*,

the shell being a dull, clayey buff, over which are numerous longitudinal lines and dashes of purplish brown or lavender. These markings are pretty evenly distributed, but are coarsest at the larger end of the egg."[1]

Mr. Stephens has kindly furnished me with some additional notes on this subspecies, and says: "The Arizona Crested Flycatcher seems to breed only in the giant cactus, and is rather common in certain localities. A set of five eggs, taken May 24, 1884, near Camp Lowell, was found in an old Woodpecker's hole in an arm of a giant cactus, 20 feet from the ground. The female was on the nest, and was shot. Incubation had just commenced. The nest was lined with hair of various kinds, mixed with bits of snake and lizard skin."

Mr. W. E. D. Scott also met with this Flycatcher about Tucson, Florence, Riverside, and in the foothills of the Catalina Mountains, up to about 4,500 feet. He states: "In the Catalinas, altitude 4,000 feet, this subspecies arrives about April 20, and remains until late in August or early in September. I found a nest at this point built in a deserted Woodpecker's hole in a dead sycamore stub. It was entirely similar in construction to that of *Muscicapa crinitus*, even to the traditional snake skins, and contained five eggs nearly ready to be hatched, very similar to those of *Muscicapa crinitus*, save that they are a little larger. But one brood is reared in the Catalina region."[2]

From three to five eggs seem to constitute a set. Nidification commences sometimes during the latter part of May, but more frequently in the beginning of June. Judging from the only specimen in the United States National Museum, the egg of the Arizona Crested Flycatcher resembles that of *Myiarchus mexicanus* closer than that of *Myiarchus crinitus*. It is not as heavily marked as the average eggs of the latter; the ground color is more of a creamy buff; the markings are not quite so profuse, and resemble those of the first more.

The only egg of this subspecies in the United States National Museum collection is the figured type, No. 25195 (Pl. 2, Fig. 12). This was taken by Dr. A. K. Fisher, June 12, 1892, on Rillito Creek, near Tucson, Arizona, from an old Woodpecker's hole in a giant cactus, about 8 feet from the ground. The nest contained one young bird just out of the shell, three eggs on the point of hatching, and an addled egg, the only one that could be saved; this measures 25.65 by 18.03 millimetres, or 1.01 by 0.71 inches, and is elliptical ovate in shape. The shell is strong, feels smooth to the touch, and is somewhat glossy.

[1] Bulletin Nuttall Ornithological Club, Vol. VII, 1882, p. 203.
[2] The Auk, Vol. IV, 1887, pp. 17, 18.

## 98. Myiarchus cinerascens Lawrence.

ASH-THROATED FLYCATCHER.

*Tyrannula cinerascens* Lawrence, Annals Lyceum of Natural History, New York, V, 1851, 121.

*Myiarchus cinerascens* Lawrence, Annals Lyceum of Natural History, New York, VII, May, 1860, 285.

(B 131, C 248, R 313, C 375, U 454.)

Geographical range: Western United States; north to southern Oregon, Nevada, Utah, and southern Colorado: east to New Mexico and southwestern Texas; south through Arizona and Lower California, and over the table-lands of Mexico; in winter to Guatemala, Central America.

Within the United States the Ash-throated Flycatcher is only a summer resident, and its breeding and geographical range correspond. It returns from its winter haunts in Guatemala and southern Mexico to southwestern Texas and southern Arizona about the beginning of March, and reaches the more northern points of its range about a month later. Climatic conditions do not seem to affect the Ash-throated Flycatcher to any extent, for it is as much at home in the mountain fastnesses of the southern Sierra Nevadas, where Lieutenant Benson found it breeding commonly in the Sequoia National Park, in Tulare County, California, at an altitude of 9,000 feet, as in Death Valley, probably the hottest place in the United States, where a pair of these birds were seen at Furnace Creek, on June 21, 1891, by Dr. A. K. Fisher. It is fairly common at Redding and Baird, in Shasta County, and at Red Bluff, Tehama County, California, and reaches about the northern limits of its breeding range in southern Oregon, where it is rare. I found a single nest of this species containing five young birds about ten days old, in a natural cavity in a juniper tree near Camp Harney, Oregon, on June 20, 1876, but they appear to be very rare there, as no others were noticed.

The Ash-throated Flycatcher is rather retiring in its habits, and is oftener heard than seen. In the vicinity of Tucson, Arizona, in the season of 1872, I found it quite common and examined a number of nests. Their favorite haunts were the denser mesquite thickets in the creek bottoms, oak groves along hillsides, and the shrubbery in canyons leading down from the mountains, but I also saw them occasionally on the more open plains covered with straggling mesquite trees and patches of cholla and other species of cacti. It is not nearly as noisy a bird as *Myiarchus crinitus*, but otherwise resembles it in its general habits. Its principal call note is a clear "huit, huit," a number of times repeated, which sounds very much like the ordinary call of the *Phainopepla;* it also utters some low, whistling notes which are not at all disagreeable to the ear. In the spring of 1872 it became abundant about the latter half of March, and several of these birds might be seen chasing each other through the mesquite forests in almost every direction, within a few hundred yards of my camp on Rillito Creek, but nidification did not appear to begin till near the end of May.

The Ash-throated Flycatcher is quite expert on the wing, but never indulges in protracted flights if it can help it. It seems to be rather quarrelsome and intolerant in its disposition toward other birds, and will not allow any to nest in close proximity; in fact, I am inclined to believe that it not infrequently dispossesses some of the smaller Woodpeckers, like *Dryobates scalaris bairdi*, of its nesting sites, as I have found its nests on two occasions in newly excavated holes, the fresh chips lying at the base of the tree, showing plainly that they had only recently been removed.

Its food consists mainly of beetles, butterflies, grasshoppers, flies, moths, and occasionally of berries, especially those of a species of mistletoe (a parasitic plant) growing abundantly on many of the trees found in southern Arizona.

By the beginning of May most of the birds are mated, and nidification begins shortly afterwards. The nests are usually placed in knot holes of mesquite, ash, oak, sycamore, juniper, and cottonwood trees, as well as in cavities of old stumps, in Woodpeckers' holes, and occasionally behind loose pieces of bark, in the manner of the Creepers. On two occasions, near Tucson, I found the Ash-throated Flycatcher using abandoned nests of the Cactus Wren, and Mr. A. W. Anthony found them nesting in the dry blossom stalks of the yucca and *Agave americana* in southwestern New Mexico. They also nested in similar localities in Lower California, in the San Pedro Martir Mountains, where he observed them at altitudes of 9,000 feet. In a letter dated July 8, 1894, he informs me that this Flycatcher was the most common species about his camp south of San Quentin, Lower California, and that many nested there, as well as about the Mission of San Fernando, in holes made by Woodpeckers in the giant cactus. Mr. H. P. Attwater reports this bird as common about San Antonio, Texas, and in this locality it reaches about the eastern limit of its range in the United States. Mr. Robert Ridgway met with it in various places in Nevada, and as far east as the Wasatch Mountains in Utah.

The Ash-throated Flycatcher nests at various heights from the ground, rarely, however, at greater distances than 20 feet. The nest varies considerably in bulk according to. the size of the cavity used. Where this is large, the bottom is filled up with small weed stems, rootlets, grass, and bits of dry cow or horse manure, and on this foundation the nest proper is built. This consists principally of a felted mass of hair and fur from different animals, and occasionally of exuviæ of snakes and small lizards; but these materials are not nearly as generally used as in the nests of our eastern Crested Flycatcher—in fact, it is the exception and not the rule to find such remains in their nests. Among about fifteen nests of this species examined by myself I only found it in three cases. As nearly as I have been able to observe, I think the female does most of the work on the nest, but the male follows her around while in search of material, and apparently guards and sings to her. I have known a pair of these birds to finish a nest in one day. This was placed in a knot hole in a mesquite stump, about 8 feet from the ground, and composed entirely of deer hair. Some of my Indian guides had dressed a couple of skins near by, and this furnished the

birds an abundant supply of suitable building material, of which they promptly availed themselves. While the walls in some nests are thick and well lined, in others there is but little attempt at lining the sides of the cavity, and only a small amount of hair is placed in the bottom of the hole on which the eggs are deposited. It depends entirely on the amount of room, and it is surprising how little space is really required by them in which to rear a family. The inner cup of a well-preserved nest of this Flycatcher, placed behind a loose piece of bark of an old cottonwood stump, measures about $2\frac{1}{2}$ inches in diameter by 2 inches in depth. The walls of this nest are composed exclusively of cattle hair, which is well quilted together and forms a fairly strong felt. The base is formed of dry grass roots, and it was placed between the soft inner and the outer bark of the tree, which kept it intact and held it firmly in position.

I discovered the first nest of this species in a dense piece of mesquite woods on May 26, 1872, and between this date and June 24 I found fifteen others, with eggs, and several with young birds, some of these being fully fledged. Not one of these nests contained more than four eggs, quite a number only three, and I do not believe that more than one brood is raised in a season. The female, I think, attends to the duties of incubation exclusively, which lasts about fifteen days. She is not a close sitter, and often leaves the nest for hours, especially during the heat of the day, but remains close by. The young are fed on the soft portions of insects, and leave the nest in about two weeks, following the parents about for some time before they are able to care for themselves. This Flycatcher leaves for its winter home about the latter part of September.

The number of eggs to a set ranges from three to six, but sets of the latter number are very rare; four are more frequently found; and an egg is deposited daily. The ground color varies from a light cream to a pinkish buff, and this is covered more or less profusely with fine longitudinal streaks and hair lines of dark purple and lavender, rarely with large, irregularly shaped blotches. The general pattern of these markings is finer than in the eggs of *Myiarchus crinitus*, and the majority can be readily distinguished from those of the latter, but not so easily from the lighter-colored types of *Myiarchus mexicanus*. In shape they vary from ovate to elliptical ovate. The shell is fine-grained, rather strong, and slightly glossy.

The average measurement of fifty-four eggs in the United States National Museum collection is 22.40 by 16.51 millimetres, or about 0.88 by 0.65 inch. The largest egg of the series measures 23.88 by 17.78 millimetres, or 0.94 by 0.70 inch; the smallest, 20.32 by 15.24 millimetres, or 0.80 by 0.60 inch.

The type specimen, No. 25218 (Pl. 2, Fig. 13), is from a set of five eggs, and was taken by First Lieut. Harry C. Benson, United States Army, in Sequoia National Park, Tulare County, California, on May 25, 1892.

## 99. Myiarchus cinerascens nuttingi (Ridgway).

NUTTING'S FLYCATCHER.

*Myiarchus nuttingi* Ridgway, Proceedings U. S. National Museum, V, 1882, 394.
*Myiarchus cinerascens nuttingi* Allen, Bulletin American Museum Natural History, IV, December, 1892, 346.
(B 131, part; C 248, part; R 313, part; C 375, part; U 454*a*.)

Geographical range: Arizona and southward through western Mexico; in winter to Costa Rica, Central America.

Nutting's Flycatcher has only recently been added to our avifauna. Dr. A. K. Fisher, while on a collecting trip through Arizona, for the United States Department of Agriculture, in the spring and summer of 1892, stopped a few days at Tucson and visited Rillito Creek, on June 12, 1892, in company with Mr. Herbert Brown, who acted as guide. While driving about among the groves of mesquite and giant cactus a Flycatcher was flushed from an old Woodpecker's hole in a giant cactus. The bird was secured, as well as a set of four fresh eggs. On comparing the specimen with the type in the United States National Museum, it proved to be *Myiarchus cinerascens nuttingi*, a small southern representative of *Myiarchus cinerascens*, not yet recorded from the United States.

Subsequently Mr. J. Alden Loring took another female at Prescott, Arizona, on June 22; and in the U. S. Department of Agriculture collection there is still another specimen, taken by Mr. Vernon Bailey at Oracle, Arizona, June 15, 1889.[1]

As yet little is known about the range and general habits of this subspecies, but it would appear from the above that it is pretty generally distributed over at least the southern half of this territory, and the most surprising thing is that it has been overlooked so long. It probably differs but slightly in its food and call notes from the other members of the genus *Myiarchus*, and its nesting habits seem likewise to be similar.

Its nest, which in construction resembles that of the preceding species, was placed in an old Woodpecker's hole in a giant cactus, about 4 feet from the ground, and contained four fresh eggs. These do not materially differ in appearance from the eggs of the Ash-throated Flycatcher. They are elliptical ovate in shape, and measure 24.38 by 17.02, 24.13 by 16.76, 24.89 by 17.02, and 23.88 by 17.53 millimeters, or 0.96 by 0.67, 0.95 by 0.66, 0.98 by 0.67, and 0.94 by 0.69 inch.

The type specimen, No. 25194 (Pl. 2, Fig. 14), is the last one whose measurement is given, and was taken as already stated.

[1] See The Auk, Vol. IX, 1892, p. 394.

## 100. Myiarchus lawrenceii (Giraud).

LAWRENCE'S FLYCATCHER.

*Muscicapa lawrenceii* Giraud, Sixteen Species of Texas Birds, 1841, 9 (by actual counting, the text not being paged).
*Myiarchus lawrenceii* Baird, Birds of North America, 1858, 181.
(B 133, C 248, R 314, C 376, U [455].)

Geographical range: Eastern Mexico; north to the lower Rio Grande Valley, in Texas; south to Guatemala, Central America.

Lawrence's Flycatcher holds a place in our avifauna on Giraud's record from the lower Rio Grande, in Texas, but it has not since been obtained there by any of the numerous collectors who have visited this region. At best it can only be regarded as a rare straggler within our borders. Although a common species in many parts of eastern Mexico, very little has been written about its general habits, which probably differ but slightly from those of its somewhat better-known western representative, *Myiarchus lawrencei olivascens.*

There is a short reference to the eggs of this species in the "Proceedings of the Zoological Society of London, 1859" (p. 384), based on specimens taken by M. A. Boucard, at Talca, Oaxaca, Mexico. They are described as pure white, with spots of two shades of brown, principally toward the larger end, where they form a ring, and measure 0.70 by 0.525 inch.

I doubt this identification, for so far as known none of the genus *Myiarchus* lay eggs in which the ground color can be called pure white, and their small size also renders it probable that they are not of this species.

## 101. Myiarchus lawrencei olivascens Ridgway.

OLIVACEOUS FLYCATCHER.

*Myiarchus lawrencei olivascens* Ridgway, Proceedings Biological Society, Washington, II, April 10, 1884, 91.
(B —, C —, R —, C —, U 455*a*.)

Geographical range: Western Mexico; north to southern Arizona; south in winter to southern Mexico, including Yucatan. Accidental in Colorado.

This interesting subspecies, which is the smallest of the *Myiarchi* found within our borders, was first discovered as a summer resident in the Santa Rita Mountains, Arizona, close to the Mexican boundary line, by Mr. F. Stephens, in the spring of 1881, and added to our fauna by Mr. William Brewster shortly afterwards.[1]

Mr. Stephens sent me the following notes on the Olivaceous Flycatcher: "I have seen this bird only in the Santa Rita Mountains, where it is common. I have taken incubating females in May and June, but never saw their eggs.

[1] Bulletin of the Nuttall Ornithological Club, Vol. VI, 1881, p. 252.

I suppose they breed in knot holes, Woodpecker's holes, etc., and I opened many such where they were present, but found no eggs, and but one hole that seemed to be occupied by them; this was an old Woodpecker hole well lined with hair."

Mr. William Brewster, in a paper on Arizona birds, based on material collected by Mr. Stephens, makes the following observations: "This pretty *Myiarchus*, scarcely larger than our common Phœbe, was met with only among the Santa Rita Mountains, where it was apparently not uncommon, although its distribution seemed to be very local, most of Stephens's specimens being taken in a single canyon. They haunted the banks of streams, perching on dead limbs, and taking frequent flights after insects. The only note heard was a short, mournful 'peeur.' No nests were found, but a female, shot May 17, was laying."[1]

Since then the Olivaceous Flycatcher has also been taken in the Huachuca Mountains by Lieut. H. C. Benson, United States Army, as well as by Dr. A. K. Fisher, who tells me that they frequent the low scrub oaks in the canyon bottoms, where they are moderately common in both these and the Chiricahua Mountains. Mr. W. E. D. Scott likewise obtained specimens in a canyon of the Catalina Mountains, at an altitude of 5,000 feet, on June 13, 1884; and a straggler has also been recorded from Colorado, taken by Capt. P. M. Thorne, Twenty-second Infantry, United States Army, near Fort Lyon, May 11, 1884. Its breeding range evidently extends through the mountain regions of southern Arizona, where it appears to be confined to the numerous canyons, whose bottoms and sides are covered with low shrubbery; it seems to avoid the larger river valleys and the open cactus and mesquite covered plains.

The late Col. A. J. Grayson says: "This little Flycatcher is very abundant in the Marias, where I met with them every day in all parts of the woods. The islands must be their most natural and favorite abode."[2]

Nothing positive seems to be known about the eggs of the Olivaceous Flycatcher. There is a set of four eggs in the United States National Museum collection, No. 13327, taken by Dr. E. Palmer, near Camp Grant, Arizona, in 1867, entered as *Myiarchus mexicanus*, which I believe belong to this subspecies. They resemble the eggs of the Ash-throated Flycatcher very closely, but are somewhat smaller than the average egg of this species.

[1] Bulletin Nuttall Ornithological Club, Vol. VII, 1882, pp. 204, 205.
[2] Proceedings Boston Society of Natural History, 1871, p. 278.

## 102. Sayornis phœbe (Latham).

PHŒBE.

*Muscicapa phœbe* Latham, Index Ornithological, II, 1790, 489.
*Sayornis phœbe* Stejneger, Auk, II, Jan., 1885, 51.
(B 135, C 252, R 315, C 379, U 456.)

Geographical range: Eastern North America; north to New Brunswick and the Provinces of Quebec, Ontario, Manitoba, Saskatchewan, and southern Athabasca to Great Slave Lake, Forts Rae, Simpson, and Resolution, Northwest Territory, Dominion of Canada; west to eastern North and South Dakota, eastern Nebraska, Kansas, the Indian Territory, and western Texas; casual to eastern Colorado and British Columbia; south in winter to eastern Mexico and Cuba.

The Phœbe, also locally known as the "Phœbe Bird," "Pewee," "Bridge," "Barn," or "House" Pewee, "Pewit Flycatcher," and in the Piedmont region of South Carolina as "Gnatcatcher," is pretty generally distributed as a summer resident, and breeds throughout all the States east of the Mississippi River, excepting Florida and the southern portions of South Carolina, Georgia, Alabama, and Mississippi, where it is only found in the mountainous parts. It has been recorded as breeding in southern Louisiana and portions of Texas. The most southern breeding records I have been able to find are those given by Dr. Leverett M. Loomis, in Pickens and Greenville counties, South Carolina, in "The Auk" (Vol. VII, 1890, p. 39, and Vol. VIII, 1891, p. 328); by Mr. Frank M. Cooms, in St. Mary's Parish, Louisiana, in "The Auk" (Vol. IX, 1892, p. 205); and by Mr. H. P. Attwater, in canyons along the mountain streams in the hilly country west of San Antonio, Texas, in "The Auk" (Vol. IX, 1892, p. 236).

Longitude 100° (west of Greenwich) marks about the western limits of its breeding range in the United States, but in the Northwest Territory it reaches west to nearly 122° at Fort Simpson, on the Mackenzie River, in latitude 62° 12′ N., where Mr. B. R. Ross, of the Hudson Bay Company, obtained a female, No. 22613, in May, 1861, which is now in the United States National Museum collection. This point, as far as yet known, marks both the western and northernmost limits of its range. Its nests and eggs have also been taken on Lesser Slave Lake, in southern Athabasca, by Mr. S. Jones; and near Fort Rae, Great Slave Lake, by Mr. R. MacFarlane; it has also been obtained by Mr. James Lockhart, at Fort Resolution; and Mr. A. McKay found the Phœbe common about Pelican Narrows, Keewatin, in June, 1891, sending several sets of eggs from there to the United States National Museum collection. He says in his notes accompanying them that "here they build in natural cavities in trees and in crevices of rocks. The Indians call them 'Moose-birds,' as they often use moose hair in lining their nests; they lay in June, and are very bold for their size, often chasing Hawks and Crows."

Many of these birds remain in Florida and the Southern States bordering the Gulf coast during winter, but the majority pass beyond to Cuba and eastern Mexico. Their flight is swift and strong when in pursuit of an enemy or while

in quest of food, but ordinarily it consists of slow, fluttering movements from point to point, especially during the mating season, and it is then never protracted.

The Phœbe, like our equally well-known Robin and Bluebird, is one of the first migrants to return from its winter home, and is quite as well known and fully as popular. It usually arrives in our Middle States during the first half of March, and a little later farther north, although occasional stragglers have been observed in Maine and northern New York during the first week in this month. The males precede the females by about a week or ten days, and move direct to their breeding grounds; mating and nest building usually beginning about a month later. Few of our native birds are more esteemed than the homely and plainly colored Phœbe, and its return to the old haunts is generally looked for with pleasure No bird is more attached to a locality once chosen for a nesting site, and no reasonable amount of annoyance and disturbance will cause it to forsake its old home. It may possibly change the location for good cause, but if it does, it will usually select another in the immediate vicinity. It would be difficult to name many native birds who do more good in a general way and less harm than the Phœbe. Its food consists mainly of small beetles, flies, moths, butterflies, etc., of which it destroys an enormous number, as it is scarcely ever at rest, darting after passing insects and catching them both on the wing and on the ground. It seems to be always hungry, and invariably finds room for another choice morsel. It is said to help itself occasionally to trout fry, but the damage caused in this respect must be very trifling, and is fully compensated for by the good it does through the destruction of many noxious insects; and, in my opinion, it deserves the fullest protection. After the berry season commences it also feeds to some extent in summer on raspberries, strawberries, mulberries, and pokeberries, and in winter on cedar berries, palmetto berries, smilax berries, and wild grapes. It is one of the most restless little creatures I know; even while perching on a fence post, the gable of an outbuilding, or a a weed stalk, its crest is often raised and lowered, its tail is forever twitching, and it appears to be unable to remain motionless for more than a minute at a time.

Dr. Ralph tells me that in Florida the Phœbe frequently alights on the backs of cattle and follows them around, catching the flies on these animals, and fluttering above them in search of insects. Their rather plaintive call notes, given by most writers as "phœbe, pe-wee, phe-be," and "pe-weet," do not sound to me in that way; they appear rather to approach the words "see-héé, see-héé," and are sometimes varied to "see-béé," or "see-whéé," with the accent on the last syllable; this call is occasionally followed by a rattling note. Its alarm note sounds like "tchäk-tchäk," and during the mating season the male indulges now and then in a low, twittering warble. It utters its calls very frequently and persistently in the early spring and for some time after its arrival, but less often during the breeding season, when the cares of housekeeping absorb more of its time.

Mr. Eugene P. Bicknell makes the following pertinent comments on its song: "It is one of those which appeal to the sympathies rather than to the ear,

fully making up in sincerity what it lacks of music. Still it must be reluctantly admitted that later, when more graceful and gifted songsters are with us, the plain Phœbe does appear a trifle unsophisticated and its notes may grow monotonous. Nevertheless, their jerky character seems to be held in high opinion by their author, and is admirably seconded by its tail."[1]

In well-settled sections it loves to frequent outhouses, barns, etc., in close proximity to human habitations situated near springs, etc.; here it becomes very gentle, tame, and confiding when not molested. I have frequently seen one alight within a few feet of my head and fly back and forth from its perch after passing insects, as undisturbed as if I had not been there. In mountain regions and thinly populated tracts it is often found about rocky cliffs, along water courses, and almost invariably near the point where a bridge spans a stream. The Phœbe is the earliest of our Flycatchers to breed, nidification beginning sometimes in the first week in April, but ordinarily not much before May 1, and in the northern parts of its range rarely before June. While generally of an amiable disposition toward other birds, often nesting in close proximity to the Barn Swallow, Robin, and Chimney Swift, it will not allow any of its own kind to occupy a site close to its own, fighting them persistently until driven off, and should one of the earlier arrivals presume to appropriate its old nest, war is at once declared. Such a case is recorded in the "Scientific American" (April 22, 1882, p. 245), by Mr. E. H. Davis, of Avon, New York, who writes as follows: "I have noticed communications in late issues of your journal upon the subject of two and three storied birds' nests. Permit me to relate the following, which I will personally vouch for. Some years ago a Phœbe Bird had built her nest on a small projection under a piazza of my father's house, and occupied the place for several successive years unmolested. One spring a Robin took possession of it before the arrival of the rightful owner, and would not give it up. The quarrel between the birds was noted by the members of the family, but nothing more was thought about it until fall, when the peculiar shape of the nest attracted attention. Upon examination it proved to be a double nest, one built upon the other, and in the lower one was found the vandal Robin, dead. The Phœbe Bird had built another nest, completely inclosing the Robin, and reared her young upon the grave of her enemy."

The same pair of birds, apparently, return to their old haunts from year to year, and if they do not always occupy the same nesting site, they usually select one near by. Occasionally they build a new nest on the top of the old one, and this is sometimes done to get rid of Cowbirds' eggs that may have been deposited by these intruders, but ordinarily they do not appear to object much to such additions, and care for them as faithfully as if they were their own. Their favorite nesting sites are under bridges and culverts, even when they are barely large enough for a person to crawl through, provided a suitable place can be found on which to place the nest; next, outbuildings, such as barns, sheds, etc., are frequently made use of; porches of houses, window sills,

[1] The Auk, Vol. II, 1885, p. 254.

etc., occasionally furnish suitable sites; overhanging rocky shelves, especially in quarries, upturned roots of trees in woods, projecting banks of small streams, caves, and more rarely the sides of open wells are likewise utilized for such purposes.

Their nests vary considerably in shape as well as in the manner of construction. If attached to the side of an overhanging rock, it is necessarily semicircular, and mainly composed of mud pellets mixed with moss, a little grass, and occasionally a few feathers, somewhat resembling the nest of our well-known Barn Swallow. If placed on a flat beam, or rafter, or on top of a post, it is circular, and sometimes but little or no mud is used in its construction.

A well-preserved nest, No. 25587, taken by Dr. William L. Ralph, near Floyd, Oneida County, New York, on May 17, 1890, was found in a swampy part of a large wooded tract, about 5 feet above the ground, and underneath the roots of a partly overturned tree; the upper parts of the roots had fallen over and the nest was behind this, placed on two small, swing-like roots that crossed each other at right angles. It is mostly composed of mud and partly covered on the outside with moss, dead leaves, a little fern down, and a few pieces of grass, and lined with horsehairs, fine roots, dry mosses, grasses, etc. It measures $4\frac{1}{2}$ inches in outer diameter by 4 inches in height, the inner cup being $2\frac{1}{2}$ inches across by $1\frac{3}{4}$ inches in depth. It is a neat, symmetrical, and compactly built structure.

Mr. J. W. Preston, of Baxter, Iowa, writes me: "A pair of Phœbes have a nest on a post in our barn, just below the hay, over the feed room, to which they return year after year, having varying success and exhibiting a rare persistence of purpose. One season the eggs were destroyed by mice, and yet a second attempt was made, and the brood came off rather late. Then another season the young died in the nest from some cause, or were killed, and the parents crowded them onto the outer walls, where they hung for more than a year, seemingly not at all in the way of the old birds." When the nest is repeatedly used, the old inner lining is mostly removed and replaced by new material.

Incubation lasts about twelve days, and the female performs the greater part of this duty, while the male remains in the vicinity of the nest on the watch for possible intruders. The female is a close sitter and is loath to leave her nest. Dr. Ralph tells me of an instance where he found a Phœbe sitting on a couple of eggs and a small pebble, which had accidentally fallen into the nest and cracked some of the eggs. The young are large enough to leave the nest in about two weeks, and a second brood is usually reared throughout the greater part of their range.

The nestlings are fed entirely on insect food, and consume an enormous quantity daily. The female rarely leaves the nest to go any considerable distance to gather the necessary supplies, but the male makes more extended excursions. I have observed a pair of these birds feeding their young; one seemed to require considerable coaxing to take the proffered morsel, and although some of the others clamored loudly for it the parent would not let them have it, and gently touched the sides of the bill of the sleepy youngster several times until it finally

opened its mandibles to be fed. I was standing within 4 feet of the nest all the time. The moth of the cutworm seems to be one of the favorite foods of the young.

The Phœbe is one of the last of our Flycatchers to leave its summer home, usually remaining in our Northern States till the latter part of September, and in favorable seasons even later. Mr. R. M. Kirby Smith writes me from Sewanee, Tennessee, that he noticed this species at different times during the months of January, February, and March, and believes that some winter there, which is quite probable, as numbers remain in Florida and the Gulf Coast generally throughout this season.

The number of eggs to a set varies from three to eight; sets of five are most commonly found, while the extremes are very rare; an egg is deposited daily, and the Phœbe is not infrequently imposed upon by the Cowbird, where this pest is common. There are several sets in the United States National Museum collection containing one or two of these parasitic eggs. The Phœbe's egg is usually pure white in color; the shell is close-grained, smooth, and moderately glossy, which gradually disappears in time, leaving the shell a dull chalky white. Occasionally some of these eggs are more or less perceptibly spotted, with a few specks of reddish brown about the larger end, but usually only one or two in a clutch are so marked, while the majority of sets are immaculate. The eggs are mostly ovate in shape.

The average measurement of one hundred and twelve eggs in the United States National Museum collection is 19.05 by 14.48 millimetres, or 0.75 by 0.57 inch. The largest egg of the series measures 20.32 by 14.99 millimetres, or 0.80 by 0.59 inch; the smallest, 16.76 by 13.72 millimetres, or 0.66 by 0.54 inch.

The type specimen, No. 25587 (Pl. 1, Fig. 28), from a set of five eggs from the Ralph collection, slightly spotted, was taken near Floyd, Oneida County, New York, May 17, 1890, and the nest, of which measurements and a detailed description have been given above, is the one from which this egg was taken.

## 103. Sayornis saya (Bonaparte).

SAY'S PHŒBE.

*Muscicapa saya* Bonaparte, American Ornithology, I, 1825, 20.
*Sayornis sayus* Baird, Birds of North America, 1858, 185.
(B 136, C 250, R 316, C 377, U 457.)

Geographical range: Western North America; eastward to western Saskatchewan and Assiniboia, Dominion of Canada, and in the United States to eastern Montana, western South Dakota (?), western Nebraska, western Kansas, and western Texas; north to Fort Yukon, Alaska, and Fort Simpson, Northwest Territory, Dominion of Canada; south to Lower California and through Arizona, New Mexico, and western Texas; in winter to Puebla and Vera Cruz, Mexico. Accidental in Massachusetts.

Say's Phœbe, a somewhat larger bird than the eastern representative of this genus, and which it replaces in western North America, has likewise a wide distribution, the northern limits of its breeding range in Alaska reaching within

the Arctic Circle. Mr. Lucien M. Turner obtained several specimens near Fort Yukon, in about latitude 67° north, in the latter part of May, 1876, and Mr. B. R. Ross, of the Hudson Bay Company, took it at Fort Simpson, on the Mackenzie River, in July, 1861, where our common Phœbe was also found by him. Skins from both places, where both of these species are known to breed, are now in the United States National Museum collection. It will undoubtedly be found in the vast intervening territory north of our border and east of the Rocky Mountains, in Athabasca and Alberta, as it is recorded from western Saskatchewan and from British Columbia. In the United States it has been taken at various points on the eastern slopes of the Rocky Mountains, but there it appears to be considerably rarer than farther west. Its breeding range in the United States is coextensive with its geographical range, excepting the southwestern parts of Texas.

Say's Phœbe seems to be more at home in rather open country, and is rarely found in heavily timbered regions; still it occurs in such localities at times, as I took a male near Fort Klamath, Oregon, on March 28, 1883, and saw a few others subsequently. During my various wanderings in our Western States and Territories I generally found Say's Phœbe rather uncommon, excepting at Fort Lapwai, Idaho, where several pairs were breeding within the limits of the garrison, as well as at the adjoining Nez Perce Indian Agency, and I met with it also at Fort Custer, Montana; Camp Harney, Oregon; Forts Colville and Walla Walla, Washington; Camp Independence, California; and near Tucson, Arizona.

Its general habits and actions resemble those of the eastern Phœbe; like it, it is one of the earliest spring migrants to return from its winter haunts, and it is equally attached to its old home, to which it regularly returns from year to year. It appears to be much more tolerant in its disposition toward other members of its kind than the Phœbe, as I have found several pairs breeding within 100 yards of each other, apparently in perfect harmony. Its manner of flight is also similar, but its ordinary call note differs somewhat, and sounds really pathetic; a plaintive "phee-eur," frequently repeated, expresses it tolerably well, always accompanied with a twitch of the tail and a raising and lowering of the crest. Besides this note, during the mating season it gives vent occasionally to a short, plaintive, twittering warble. I consider it a more restless bird than the Phœbe, if that is possible; for it is never idle, but constantly darting back and forth from its perch after passing insects, which form the bulk of its food and of which it never seems to get enough. I have repeatedly seen it catching good-sized grasshoppers on the wing, as well as different species of beetles, flies, moths, and butterflies. It has a habit similar to the Owls of ejecting the indigestible portions of its food in the shape of pellets. My attention was drawn to this fact by observing several such lying on the porch of my quarters at Fort Lapwai, Idaho, where a pair of these birds nested over the door. It is not nearly as partial to localities near water as is our Phœbe, and it is not unusual to find it nesting fully a mile from such places. At this Post they

generally arrived during the third week in March, the males preceding the females about a week, and nest repairing or building commenced about the latter part of this month. I have taken a full set of eggs, containing small embryos, on April 17, 1871. Here they nested mostly under the eaves of outhouses and stables; but one pair selected the plate or rail over the main door of my quarters, and another a corner on the hospital porch. In this vicinity I also found a pair occupying an old Cliff Swallow's nest attached to an overhanging ledge of rock in Soldiers' Canyon, on the road to Lewiston, Idaho, and another in a very unusual position in the same canyon, in an old Robin's nest, placed in a syringa bush, about 4 feet from the ground.

Mr. R. S. Williams found Say's Phœbe nesting in a deep canyon near the Crooked Falls of the Missouri, Montana, and sent two sets of eggs to the United States National Museum from there. These nests were placed on a slightly projecting ledge of rocks, and were well protected by overhanging walls. The first, containing six eggs, was taken May 21, 1888; the other was obtained on June 3, 1889.

Mr. W. G. Smith reports Say's Phœbe as common in Larimer County, Colorado, where it usually nests under bridges and in sheds and barns. He says it builds a bulky nest, mostly composed of wool, and if its eggs are taken or destroyed it often lays three clutches during a season, and not infrequently in the same place.

In Colorado it reaches an altitude of about 7,000 feet, and here Mr. J. Alden Loring reports it as not uncommon at Grand Junction, and Mr. Denis Gale found it breeding near Gold Hill on June 25, 1885; but it is evidently much more common throughout the Great Basin region in southern Idaho, Utah, Nevada, and eastern California, where its center of abundance occurs. While Say's Phœbe is fairly common in suitable localities in northern California, as in the vicinity of Red Bluff, Tehama County, Mr. F. Stephens reports it as a rare summer resident in the southern parts of this State, and says: "It is more common in winter, though scarcely common then. It breeds early along the western borders of the Colorado Desert, where I have found nests containing young in the latter part of March. The nests were placed on shelves under overhanging parts of cliffs, in shallow caves and similar places; the eggs usually numbered four; the nests were built of soft fibers; no mud was used; and I have seen none near water. These birds are generally seen singly except in the breeding season; they inhabit open country and are never seen in forests. On June 1, 1893, I flushed a Say's Phœbe from a nest containing fresh eggs near Witch Creek, California. The nest was placed under a shelf of rock on a small cliff over a brook. The nest, of mud, looked like the nest of *Sayornis nigricans*, and perhaps was an old one of that species relined. This is the first time I have found this species nesting on the west side of the mountains, while on the desert side they breed regularly."

Mr. John Swinburne found this species nesting at St. Johns, Apache County, and Mr. W. E. D. Scott gives it as a rather rare summer resident in the Catalina Mountains, Arizona, while I observed it in the vicinity of Tucson in winter only.

Mr. A. W. Anthony writes me: "I found Say's Phœbe breeding in comparative abundance near Apache, in the extreme southwestern corner of New Mexico, in the midst of a very dry and barren range of hills, in May, migrating after the first brood was raised, about June 20, and not seen again until September. Old tunnels and abandoned mining shafts are favorite nesting sites with them, nests having been found by me in Lower California, 25 feet from the surface, in prospect holes. At Apache I took a nest with four fresh eggs on May 23, 1886, and near San Diego, California, I found one in an old embankment, on August 8, containing young and eggs." A nest taken by Mr. J. A. Loring, in Nephi, Utah, July 1, 1893, was placed in the top of an old straw hat.

Both Mr. L. Belding and Mr. A. W. Anthony have met with this species in Lower California, during the breeding season; and it probably breeds also in northwestern Texas and northern Mexico. It returns from its summer haunts in the northern parts of its range usually about September, and winters to some extent in the southwestern parts of the United States; the majority, however, pass south into Mexico. In the more southern portions of its breeding range Say's Phœbe begins nesting early in March; in the middle parts rarely before May 1, and in the extreme northern limits of its range not until June.

Two broods are usually raised in a season, and, under favorable circumstances, possibly even three. This species is fully as much at home about human habitations, and seems to adapt itself even more readily to the changed conditions of its surroundings than its eastern relative, and about every cattle ranch, stage station, or mining camp a pair or more of these birds will surely select a nesting site, if a suitable location can be found.

Besides the various localities already mentioned in which Say's Phœbe has been found nesting, burrows of Bank Swallows are also occasionally occupied. Ordinarily mud is not used in the construction of their nests; which are rather flat structures; the base usually consists of weed stems, dry grasses, moss, plant fibers of different kinds, wool, empty cocoons, spider webs and hair, the inner lining being generally composed of wool or hair alone. A well-preserved nest, now before me, from the Crooked Falls of the Missouri, Montana, taken by Mr. R. S. Williams, June 3, 1889, measures 5½ inches in outer diameter by 2¼ inches in height, the inner cup being 2½ inches by 1¼ inches in depth. This is a compactly built structure, the materials composing it being well worked together, and it is warmly lined with cattle hair.

The number of eggs to a set varies from three to six; usually four or five are found, and one is deposited daily. Incubation lasts about twelve days; the young are fed entirely on insects, mainly on small butterflies, which are abundant about that time, and they are ready to leave the nest in about two weeks, when the male takes charge of them, the female in the meantime getting ready for a second brood. The eggs are ovate and short ovate in shape, and resemble those of the common Phœbe in every respect excepting that they are a trifle larger in size.

The average measurement of forty-four eggs in the United States National Museum collection is 19.50 by 14.90 millimetres, or about 0.77 by 0.59 inch.

The largest egg of the series measures 21.59 by 15.49 millimetres, or 0.85 by 0.61 inch; the smallest, 18.03 by 13.97 millimetres, or 0.71 by 0.55 inch.

The type specimen, No. 20553 (Pl. 1, Fig. 29), from a set of four eggs, Bendire collection, taken by the writer at Fort Lapwai, Idaho, April 24, 1871, is an average-sized egg, and one of the usual unspotted types.

## 104. Sayornis nigricans (Swainson).

BLACK PHŒBE.

*Tyrannula nigricans* Swainson, Philosophical Magazine, I, May, 1827, 367.
*Sayornis nigricans* Bonaparte, Collection Delattre, 1854, 87.
(B 134, C 251, R 317, C 378, U 458.)

Geographical range: From Mexico and Lower California north through western Texas, New Mexico, Arizona, and California into southwestern Oregon, west of the Cascade Mountains; east to western Texas, southern New Mexico, Arizona, and southern California. Casually to Washington.

The breeding range of the Black Phœbe, also known as the "Black Flycatcher," is much more restricted within the United States than that of the two preceding species, but in Mexico it has a widely extended distribution. In southwestern Oregon it has been observed in the Umpqua Valley by Dr. J. S. Newberry; and Prof. O. B. Johnson reports seeing a single specimen near Salem in July, 1879. These points mark about the northwestern limits of its range, and none have as yet been observed east of the Cascade Mountains at points farther south in this State. Its center of abundance is evidently that part of California west of the Sierra Nevadas, where it has been recorded from many places throughout the year. Mr. Lyman Belding reports it as a common and constant resident at Stockton, Murphys, and Marysville, and as a summer resident near Big Trees, Calaveras County, where it frequents the willows near streams. Mr. Charles H. Townsend found it breeding near Baird, Shasta County, and it seems to be pretty generally distributed throughout southern California as well. While apparently not reaching the eastern slopes of the Sierra Nevadas in the northern parts of this State, it has been observed as far east as Furnace Creek, Death Valley, Hot Springs, in the Panamint Valley, and Shepherd Canyon, in the Argus Range, in southeastern California, by different members of Dr. C. Hart Merriam's exploring party in the Death Valley country, in the spring of 1891; but it appears to be somewhat rare everywhere east of the Sierra Nevadas.

Mr. A. W. Anthony writes me: "The Black Phœbe breeds throughout Lower California, from latitude 28° northward wherever water is found, building under the eaves of adobe houses when near human habitations, and on the sides of ledges along streams in the unsettled parts."

In southern Arizona this species is resident throughout the year, and I have observed it at all seasons. It is, however, more common in winter than in summer, the majority of these birds evidently retiring to the canyons in the foothills of the mountains to breed. I found but a single nest; this was placed

in an abandoned well, in a small cavity in the side, caused by a bowlder dropping out, about 4 feet below the surface of the ground. It contained young, nearly full grown, on April 24, 1872. Mr. W. E. D. Scott reports this species as not uncommon in the Santa Catalina Mountains to an altitude of 4,000 feet. Dr. Edgar A. Mearns, United States Army, informs me that he found a pair breeding at the reservoir from which the town of Tombstone derives its water supply, in Millers Canyon, Huachuca Mountains, southern Arizona, on July 31, 1894. This is located in the Douglass spruce zone (*Pseudotsuya taxifolia*), at an altitude of about 8,000 feet. I also met with the Black Phœbe in southwestern New Mexico, on the Mimbres River, and Mr. William Lloyd gives it as a rare summer visitor in Tom Green County, Texas, where he found it breeding on April 4. Although a good many of these birds winter within our borders, even in localities where snow occasionally falls, the majority migrate south into Mexico in October, and return again early in March.

In its general habits the Black Phœbe resembles the common Phœbe more than Say's; like the former, it is usually only found near water, and its call notes are also very similar. Mud seems to enter largely into the construction of its nests, and I believe is invariably used. These are located in similar situations to those of the two preceding species. It is equally attached to a locality once chosen for a nesting site; and instances are recorded where four clutches of eggs have been laid in one season, the three previously laid having been taken. Two broods are generally reared in a year, and perhaps three. The exterior of the nest consists of small pellets of mud mixed with bits of dry grass, weed fibers, or hair, and somewhat resembles that of a Barn Swallow; the outer mud wall is carried up to the rim. Inside it is lined with weed fibers, fine roots, strips of bark, grass tops, hair, wool, and occasionally feathers. If their eggs are taken, they generally lay another set within two weeks. A nest now before me, taken by Mr. H. W. Henshaw, at Santa Ysabel, California, on April 28, 1893, measures 5 inches in outer diameter and $3\frac{1}{2}$ inches in height; the inner cup is $2\frac{3}{4}$ inches in diameter and $1\frac{1}{2}$ inches in depth, and is lined with plant fibers and fine grass tops. In the southern part of its breeding range nidification begins usually in the first half of April, rarely before, and correspondingly later farther northward.

The number of eggs to a set varies from three to six, usually four or five. They resemble the eggs of the two preceding species in color, but generally average a trifle smaller. Judging from those before me, the markings on the spotted specimens are coarser and more pronounced, but the proportion of spotted eggs is no greater. The eggs are generally ovate in shape.

The average measurement of fifty-nine specimens in the United States National Museum collection is 18.73 by 14.36 millimetres, or about 0.74 by 0.57 inch. The largest egg of the series measures 20.32 by 15.24 millimetres, or 0.80 by 0.60 inch; the smallest, 17.78 by 13.21 millimetres, or 0.70 by 0.52 inch.

The type specimen, No. 20556 (Pl. 1, Fig. 30), from a set of three eggs, Bendire collection, was taken at Nicasio, California, May 5, 1877; this represents a well-spotted and average-sized specimen.

## 105. Contopus borealis (Swainson).

OLIVE-SIDED FLYCATCHER.

*Tyrannus borealis* Swainson, Fauna Boreali Americana, II, 1831, 141, Pl. 35.
*Contopus borealis* Baird, Birds of North America, 1858, 188.
(B 137, C 253, R 318, C 380, U 459.)

Geographical range: North America; north in the eastern parts of the Dominion of Canada to about latitude 50°, in the interior of the Hudson Bay country to about latitude 61°, and in Alaska to latitude 63° N.; south in winter through the higher mountains of Central America to Colombia, South America. Accidental in Greenland.

The breeding range of the Olive-sided Flycatcher in the eastern parts of the United States is confined to the coniferous forest regions of our northern border from northern Massachusetts and northern New York westward to Minnesota, and probably also to some of the higher mountain peaks south of these States; in Connecticut, Pennsylvania, the Virginias, and western North Carolina, etc., where it has occasionally been taken during the breeding season and possibly nests in limited numbers in suitable localities. It has also been observed in the mountains of western Missouri by Mr. W. E. D. Scott in the spring, and possibly breeds there; and the late Col. N. S. Goss reports that he found it nesting near Wallace, Kansas, on May 27, 1883, an unusually early date for this species. In the eastern provinces of the Dominion of Canada it breeds up to about latitude 50° N., while in the interior it appears to be fairly common in the provinces of Manitoba and Saskatchewan, the type coming from Cumberland House, in latitude 54°. It extends north at least to Fort Resolution, Great Slave Lake, in latitude 61°, where Mr. R. Kennicott took a male on June 20, which is now in the United States National Museum collection. On the Pacific Slope it has been taken by Mr. F. Bishoff at Fort Kenay, Alaska, in latitude 61°, and Mr. E. W. Nelson obtained a single bird on the Lower Yukon, in latitude 63°, which marks, as far as known, the northern limit of its range. Mr. J. E. McGrath also took a specimen at Camp Davidson, Alaska, on May 18, 1891, which, together with the Bishoff skin, is now in the United States National Museum collection. These records show that the Olive-sided Flycatcher is pretty generally distributed over the southern coast districts of this territory. From Alaska its breeding range extends southward through British Columbia, Alberta, the forest and mountain regions of the western United States, including the Rocky, Cascade, and Sierra Nevada mountains, with their tributary spurs and outlying ranges, to southern Colorado, New Mexico, Arizona, the San Pedro Martir Mountains in Lower California, the Sierra Madre in northern Mexico. It passes thence south in winter through the higher mountains of Central America to Colombia, South America.

West of the Rocky Mountains the Olive-sided Flycatcher seems to be generally distributed throughout the forest and mountainous regions to the Pacific coast, although it is nowhere very common. Mr. S. F. Rathbun, of Seattle,

Washington, writes me: "This Flycatcher may be called common around Seattle as a summer resident, arriving about May 1 and remaining into September. It is very evenly distributed, not indiscriminately scattered, as are some species, but along the shores of Lake Washington about every one-half to three-fourths of a mile you can hear these birds and find a pair. They evince a fondness for the watered regions in preference to the high lands, not necessarily along the water's edge, but only a short way back in the woods, and prefer the rather open timber where most of the original forest has been cut away."

In northern and central California it appears to be moderately common throughout the mountainous portions, judging from the numerous records. Mr. L. Belding found it breeding in Calaveras County, and took a nest and three eggs on June 17, 1883, these being now in the United States National Museum collection; while from southern California Mr. F. Stephens writes me: "It is a somewhat rare summer resident in coniferous forests, seeming to prefer the firs. I found a nest on June 5, 1889, in a large fir, at about 7,500 feet altitude in the Cuyamaca Mountains; it was placed about 40 feet from the ground and 8 feet from the trunk near the extremity of a limb. It consisted of little more than a lining of stiff moss, laid in a thick bunch of living leaves, and contained three eggs. While taking these the parent came repeatedly, almost within reach of my hand, snapping her bill and scolding me. Lower down in the same tree was a nest of the Louisiana Tanager containing young."

There are also records from Arizona and New Mexico showing that the Olive-sided Flycatcher breeds, to some extent at least, in the higher mountain regions there, and in Colorado it may be called fairly common. Mr. Denis Gale writes me from Gold Hill, Colorado, in 1889: "I have found a nest or two of *Contopus borealis* almost every season, but always with young, until this year. Their nests are very small and fragile in appearance for so large a bird, but the wiry character of the material used in their composition is so deftly fitted and fastened to and about the rasping sprays of our spruce trees that you could scarcely displace the nest if you should thrash the ground with the bough upon which it is placed." A nest with three eggs, taken on July 3, 1889, was kindly presented to the United States National Museum collection by Mr. Gale, and this is the frailest-built structure I have yet seen of these birds. In Colorado the Olive-sided Flycatcher reaches an altitude of 9,000 or 10,000 feet in summer. In the San Pedro Martir Mountains, in Lower California, Mr. A. W. Anthony informs me that this Flycatcher was occasionally observed by him up to 11,000 feet, and evidently nesting.

I have met with this species in the pine forests of the Bitter Root Mountains in Montana and Idaho, in the numerous parks in the Blue Mountains, and at Fort Klamath, Oregon, where several pairs nested within a couple of miles from the Post, in large spruce and pine trees which were practically inaccessible. In suitable localities in the southwestern parts of the Adirondacks, in Herkimer County, New York, they are not uncommon, and I observed several pairs in this vicinity. Their habits seem everywhere to be alike.

Although the Olive-sided Flycatcher is rather evenly and widely distributed, it can not be called a very common bird anywhere during the breeding season, which is due perhaps more to its unsocial and quarrelsome habits than to anything else. While it appears tolerant enough toward other species, it will not allow any of its own kind to nest in close proximity to its chosen home, to which it returns from year to year. Each pair seems to claim a certain range, which is rarely less than half a mile in extent, and is usually located along some stream, near the shore of a lake, or by some little pond; generally coniferous forests seem to be preferred, but mixed ones answer their purposes almost equally well as long as they border on a body of water or a beaver meadow and have a few clumps of hemlock or spruce trees scattered through them, which furnish suitable perches and points of lookout. In such situations one is reasonably certain to find this species.

Like all Flycatchers, their food consists almost exclusively of winged insects, such as beetles, butterflies, moths, and the numerous gadflies which abound in the places frequented by these birds. A dead limb or the decayed top of some tall tree giving a good outlook close to the nesting site, is usually selected for a perch, from which excursions are made in different directions after passing insects, which are often chased for quite a distance. This Flycatcher usually arrives on its breeding grounds in the northern parts of the United States about the middle of May, and its far-reaching call notes can then be heard almost constantly in the early morning hours and again in the evening. Unless close to the bird, this note sounds much like that of the Wood Pewee, which utters a note of only two syllables, like "pee-wee," while that of the Olive-sided Flycatcher really consists of three, like "hip-pui-whee." The first part is uttered short and quick, while the latter two are so accented and drawn out, that at a distance the call sounds as if likewise composed of only two notes, but this is not the case. Their alarm note sounds like "puip-puip-puip," several times repeated, or "puill-puill-puill;" this is usually given only when the nest is approached, and occasionally a purring sound is also uttered.

Nidification rarely begins anywhere throughout their range before June 1, usually not before June 10, and in some seasons not before July. Tall evergreen trees, such as pines, hemlocks, spruces, firs, and cedars, situated near the edge of an opening or clearing in the forest, not too far from water and commanding a good outlook, or on a bluff along a stream, a hillside, the shore of a lake or pond, are usually selected as nesting sites by this species, and the nest is generally saddled well out on one of the limbs, where it is difficult to see and still more so to get at. Only on rare occasions will this species nest in a deciduous tree; one instance has been recorded of a pair nesting in an apple and another in a cottonwood tree, but these must be considered as exceptional cases.

While on a collecting expedition with Dr. William L. Ralph, in Herkimer County, New York, a nest of this species was found on June 18, 1892, in a spruce tree, 45 feet from the ground, containing three eggs about one-third incubated. The nest was placed on a horizontal limb, on some thick, leaf-covered twigs,

about 5 feet from the trunk; the tree grew on a hillside near a little swamp, and several tall dead stumps were still standing on the partly cleared hills in the vicinity. The birds betrayed the location of the nest by their excited actions and incessant scolding. They were very bold, flying close around the climber's head, snapping their bills at him, and uttering angry notes of defiance rather than of distress, sounding like "puy-pip-pip" or "wüp-wüp-wüp." They could not possibly have been more pugnacious. This nest, which is now before me, is a well-built structure, and measures $4\frac{3}{4}$ inches in outer diameter by $1\frac{3}{4}$ inches in depth; the inner cup is very shallow, measuring $2\frac{3}{4}$ inches in diameter by 1 inch in depth. It is outwardly composed of fine, wiry roots and small twigs, mixed with long, green moss (*Usnea*), and lined with fine roots and moss. It is securely fixed among a mass of fine twigs growing out at that point of the limb, which is only half an inch thick under the nest. During the first week of June, 1893, we visited the same locality again, but these birds did not make their appearance at the old nesting site until about June 15, and showed no desire to nest up to the time we left, June 28. Two other pairs were also located, but no nests were found. I am of the opinion that, as the season was unusually late, they postponed nidification until at least three weeks later than usual.

Mr. Belding states: "In California its nests are usually 40 or 50 feet from the ground, rarely as low as 20 in cone-bearing trees, and are mostly composed of yellow lichen (*Evernia vulpina*), lined sparingly, in several instances, with fine, wiry rootlets."[1]

The nest is usually placed at a considerable height from the ground, say from 40 to 60 feet, and always out on a limb; occasionally one is found not over 20 feet up, but such instances so far as I know are not common. The nests are generally hard to get at, and as they are so shallow the contents are frequently lost in trying to secure them. The Olive-sided Flycatcher usually nests late, rarely before the middle of June, and sometimes not until the beginning of July. Only a single brood is reared in a season; but if the eggs are taken a second set is laid, and not infrequently in the same nest, if this has been left. They are very much attached to localities once selected, and are loath to leave them. The return migration to their winter haunts begins in the latter part of August, and, as far as known, all of these birds pass beyond our border.

It does not take very long to build the nest, and incubation lasts probably not over fourteen days. The young are said to remain in the nest about three weeks. The eggs are usually three in number, rarely more or less. Possibly about one set in twenty will contain four eggs, and although it has been stated that from three to five are laid, I do not believe that a set of five has ever been taken. The shape of these eggs is mostly ovate; the shell is delicate and not lustrous. The ground color varies from a pale to a rich cream, with a pinkish tint, and they are usually spotted and blotched with different shades of chestnut, ferruginous, heliotrope purple, and lavender, these markings generally forming an irregular wreath about the larger end of the egg.

[1] Land Birds of the Pacific District, 1890, p. 97.

The average measurement of thirty-two eggs in the United States National Museum collection is 21.51 by 16.10 millimetres, or about 0.85 by 0.63 inch. The largest egg of the series measures 23.11 by 17.27 millimetres, or 0.91 by 0.68 inch; the smallest, 20.32 by 15.24 millimetres, or 0.80 by 0.60 inch.

The type specimen, No. 23891 (Pl. 2, Fig. 15), from a set of three eggs taken by Mr. Gale, near Gold Hill, Boulder County, Colorado, on July 3, 1889, represents one of the richer-colored eggs, while No. 25685 (Pl. 2, Fig. 16), from a set of three, Ralph collection, also from Colorado, taken June 16, 1892, shows a paler-colored example; they also show the difference in size.

## 106. Contopus pertinax Cabanis.

COUES'S FLYCATCHER.

*Myiarchus pertinax* Lichtenstein, Nomenclator Mueso Berolinensis, 1854, 16 (nomen nudum).

*Contopus pertinax* Cabanis, Museum Heineanum, II, Sept. 30, 1859, 72.
(B—, C 254, R 319, C 381, U 460.)

Geographical range: Highlands of Guatemala and Mexico; north to Arizona and southwestern New Mexico. Accidental in Colorado.

The breeding range of Coues's Flycatcher is coextensive with its geographical distribution in the United States, where it is only a summer visitor. It was added to our avifauna by Dr. Elliott Coues, who took a specimen near Fort Whipple, Arizona, on August 20, 1864; and since then it has been found to be generally distributed throughout the mountains of the southern half of Arizona and southwestern New Mexico, although nowhere very common.

The best account of its general habits is that of Mr. H. W. Henshaw, who says: "In 1873 I obtained a pair of old birds, which were accompanied by several young, in the White Mountains, near Camp Apache, and, not meeting with it elsewhere, supposed it to be rare. Such, however, proves not to be the case, as the past season it was found to be one of the most numerous and characteristic of the Flycatcher tribe, being seen everywhere in the mountainous districts from Camp Apache to the border line.

"In general appearance as well as habits it is quite similar to the Olive-sided Flycatcher, and shows the same proclivities for inhabiting the pineries, often on the edge of an opening, or where the country is diversified and cut up by rocky ravines and the pines are interspersed with oak woods. In such places the species is sure to be present, and may be seen circling about the high pine stubs or descending to the lower trees, as the oaks, and launching itself out from the branches in vigorous pursuit of flies or beetles, which it hunts with the greatest energy and perseverance. The notes are loud and very forcibly given, possessing the same character as the call of the Olive-sided Flycatcher, but are readily distinguishable. They resemble the syllables 'pe-wee-ee,' great emphasis being laid on the middle syllable, while the last is quite prolonged and in a slightly raised key. Each pair apparently takes

possession of a large area, and allows no intrusion of their kind within the limits. Having spent a few moments in one spot, the bird makes a hurried dash, and in a few moments its voice can be just distinguished as it is sent back from afar in answer to the mate near by. A short interval elapsing, it will suddenly reappear from among the trees, and, with an exultant whistle, settle firmly down on some perching place, giving short, nervous jerks of its long tail and turning its head quickly here and there, every motion betraying the nervous activity of its nature. These sudden erratic flights from point to point are quite characteristic of the bird. By the middle of July I found the young well fledged and quite numerous. Thus the eggs are probably deposited in the first part of June. By the latter part of September many individuals had passed to the southward, but at Mount Graham at this time the species was still present. I noticed them on several occasions on the outskirts of the flocks of Warblers and Nuthatches, which were moving slowly onward. They appeared to be migrating in their company, forming, as it seemed to me, a very incongruous element in these sociable gatherings. Their call notes at this time were given almost as incessantly as during the summer."[1]

Mr. F. Stephens writes me: "I have taken this species in the mountains north of Fort Bayard, New Mexico, and in the Chiricahua and Santa Rita Mountains, in southern Arizona, in all parts of which it is a rare summer resident. The female of a pair taken June 27, 1880, in the Chiricahua Mountains, was incubating."

Mr. W. E. D. Scott also observed them in the Santa Catalina Mountains in April, and Dr. Edgar A. Mearns, United States Army, in the Mogollon Range, Arizona, during the months of July and August, where a pair were seen feeding their young on Baker's Butte. He says: "Its habits resemble those of the smaller species of this genus rather than of the Olive-sided Flycatcher."[2]

The nest and eggs of Coues's Flycatcher were first described by Mr. Samuel B. Ladd, West Chester, Pennsylvania, in "The Auk" (Vol. VIII, 1891, p. 315). "The nest, placed on an oak limb 20 feet from the ground, is compact, and reminds one of the nest of our *Contopus virens*, excepting in size. Outside diameter, 5 inches by 2 inches high; inside diameter, 3 inches by 1 inch deep. The body of the nest seems to consist of the web of some spider, intermingled with the exuviæ of some insect, fragments of insects, and vegetable matter, such as staminate catkins of *Quercus emoryi*, a pod of *Hosackia*, and some leaves of *Quercus emoryi* and *Quercus undulata*. The interior of the nest is made up of grasses, principally of two species of *Poa*, also some fragments of a *Bontelona* and a *Stipa*. The eggs, three in number, were slightly incubated. The ground color is cream buff, spotted in a ring around the larger end with chestnut and lilac-gray. Measurements: 0.63 by 0.86, 0.62 by 0.83, 0.61 by 0.83 inch; average, 0.62 by 0.84. Collected June 17, 1890."

Through the kindness of Mr. E. W. Nelson I am enabled to figure an egg of this species and add the following information about their nesting habits.

[1] United States Geographical Surveys, Vol. V, pp. 352–3.

[2] The Auk, Vol. VII, 1890, p. 256.

He says: "*Contopus pertinax* is a sparingly distributed summer resident in the pine-forested mountains of south central Mexico, between 8,000 and 12,000 feet altitude. At Los Vigas, Vera Cruz, on June 14, 1893, a nest containing two fresh eggs was found in a pine tree at an altitude of about 8,000 feet. The nest was about 15 feet from the ground, on the outer end of one of the lower branches. It was placed upon a small fork of the main branch. The nest is outwardly composed of grass tops, which are covered with fragments of moss and lichens, and it is lined with the fine heads (seed tops) of a species of grass growing all about under the pine trees of the vicinity. The locality was on a gentle slope at the northeast base of the Cofre de Perote, near Los Vigas, in a thick growth of small pines. The parent birds paid but little attention to the nest, but were quite shy, so that some trouble was experienced in obtaining one of them; each time, however, the birds returned to the vicinity of the nest after a long detour through the woods. So far as I saw them, these birds are very quiet during the breeding season."

The nest, which is now before me, is a compact and neatly built structure, and measures 4½ inches in outer diameter by 2 inches in height. The inner cup is 2½ inches wide by 1¼ inches deep.

Coues's Flycatcher leaves its summer home in southern Arizona and New Mexico about October 1, and apparently none winter within our borders. The eggs are ovate in shape; the shell is frail and without luster, of a rich cream tint, and is sparingly spotted, principally about the larger end of the egg, with different shades of chestnut, ferruginous, and lavender. They resemble very much the eggs of the Olive-sided Flycatcher, but average a trifle smaller, measuring 21.08 by 16.51 and 19.56 by 15.75 millimetres, or 0.83 by 0 65 and 0.77 by 0.62 inch, respectively.

The type specimen, No. 26222 (Pl. 2, Fig. 17), United States National Museum collection, the smallest egg of the two, was taken by Mr. Nelson, as already stated, on June 14, 1893, near Los Vigas, Vera Cruz, Mexico.

## 107. Contopus virens (Linnæus).

WOOD PEWEE.

*Muscicapa virens* Linnæus, Systema Naturæ, Ed. 12, I, 1766, 327.
*Contopus virens* Cabanis, Journal für Ornithologie, III, Nov., 1855, 479.
(B 139, C 255, R 320, C 382, U 461.)

Geographical range: Eastern North America; north to the southern portions of the Dominion of Canada, from New Brunswick to Manitoba; west to eastern North and South Dakota, eastern Nebraska, Kansas, the Indian Territory, and Texas; south in winter through eastern Mexico and Guatemala to Colombia and Ecuador, South America.

The breeding range of the Wood Pewee, also locally known in South Carolina as "Dead-limb bird," extends through the eastern United States north into the southern parts of the Dominion of Canada to about latitude 46° N., west to western Manitoba, the eastern parts of North and South Dakota,

Nebraska, Kansas, the Indian Territory, and somewhat beyond the eastern half of Texas, where it has been found breeding in Bexar and Tom Green counties. In the extreme southern parts of its breeding range, in Florida and the Gulf Coast, it is rather rare, and this is also the case north of latitude 45°, in southern New Brunswick and the provinces of Quebec and Ontario, while in Manitoba it appears to be tolerably common up to latitude 50°.

The Wood Pewee, as its name implies, is a common summer resident throughout all the wooded portions of its range as indicated above, and is one of the more tardy migrants to arrive on its breeding grounds, reaching them in the more southern States in the first half of April, and in Pennsylvania, New York, etc., about a month later. It shows a decided preference for open, mixed woods, free from underbrush, and frequents the edges of such as border on fields, clearings, etc., either in dry or moist situations. In Oneida and Herkimer counties, New York, I found the Wood Pewee common everywhere, both in the more extensive forests, as well as in orchards or shade trees along the country roads, and even in the villages. Its plaintive call notes could be heard at all hours of the day and often in the night as well. Its song, if it may be called such, is uttered in a sleepy, listless manner, while perched on some horizontal limb or branch, usually one of the lower dead ones of a wide-spreading tree, on which its sits very erect and alert, and from whence it darts every little while after some passing insect, in the capture of which it is as expert as any of our Flycatchers. The ordinary call note sounds like "péé-a-wéé" or "séé-é-wéé," long drawn out and plaintive in sound. Occasionally a short note like "péé-éér," "phéé-héé," or "héé-éé" is also given, this, if possible, in a still more mournful strain than the former, but it is not as frequently heard. I find it very difficult to reproduce the various calls on paper, and am perfectly well aware that no two persons would put them down exactly alike. The male Wood Pewee, during the mating season, gives vent occasionally to a low, twittering warble, possibly an indication to its mate that all is well.

Its food, like that of all Flycatchers, consists almost entirely of winged insects, but I have seen now and then a Wood Pewee fluttering about a leaf or small twig, as if it was picking off minute caterpillars or plant lice. Mr. George A. Seagle, superintendent of the Wytheville (Virginia) Fish Commission station, states: "This little bird has frequently been seen to catch young trout from the ponds soon after they had been transferred from the hatching house." It is possible that it may occasionally do a little harm in this manner, but, on the whole, it certainly is an exceedingly useful bird, fairly well behaved toward its neighbors, as long as they do not encroach too close on its nesting site, and it deserves protection. It nests rather late; throughout our Middle States rarely before the first week in June, and somewhat later farther north. In the vicinity of Washington, District of Columbia, full sets of eggs may be looked for in the first half of June, while in the more northern States nidification is at its height during the latter part of this month and the first week in July.

In the choice of nesting sites the Wood Pewee is not very particular; it is equally at home among human habitations, in villages or near farmhouses, as

amidst the extensive forest regions of the Adirondacks and similar tracts. The trees most frequently selected for nesting are oak, elm, ash, maple, hickory, pine, locust, poplar, cedar, and apple, the nests being placed from 5 to 50 feet from the ground, ordinarily from 12 to 20 feet up. These are rather neat and handsome structures, consisting generally of thick side walls and very thin bottoms; they are sometimes securely saddled on a horizontal limb, but more frequently at the point of juncture of a fork on the same, and generally some distance out from the main trunk. According to my observations, decayed moss and lichen covered limbs, growing out horizontally from the trunk, appear to be their favorite nesting sites, but many of their nests are built on live limbs, especially in oak, locust, and old apple trees. The nest is not readily discovered on account of its peculiar construction giving it the appearance of a knot, and the bird is exceedingly alert and usually slips off before one sees her, and, although she remains close by, flying from place to place and uttering her plaintive calls, she will not reveal its location by returning to it while the intruder is in the neighborhood.

Mr. J. W. Preston, of Baxter, Iowa, writes me: "A pair of Wood Pewees built on a horizontal branch, 12 feet above a path over which I traveled several times each day, and, though the female became more and more accustomed to my presence, she never remained on the nest while I passed. She would fly to a certain dead snag and peer down on me with her large eyes; but the young, after leaving the nest, became quite tame."

Fine grasses, small pieces of moss, thin strips of bark, rootlets, and plant fibers constitute the body of the nest, which is coated externally with bits of lichens found on rotten limbs, and which are fastened to its sides with spider webs and cocoons, similar to those of the Blue-gray Gnatcatcher and Ruby-throated Hummingbird. All the different materials are well interwoven, and the inner cup of the nest is usually lined with finer materials of the same kind, and occasionally with a little wool, down of plants, a few horsehairs, and bits of thread. An average and typical nest of the Wood Pewee measures $2\frac{3}{4}$ inches in outer diameter by $1\frac{3}{4}$ inches in depth; the inner cup is about $1\frac{3}{4}$ inches wide by $1\frac{1}{4}$ inches deep.

Mr. J. L. Davison, of Lockport, New York, kindly sent me for examination a unique nest of this species, taken by him from a horizontal limb of an apple tree, about 8 feet from the ground, which well deserves mention. This nest, which is well preserved, is exteriorly composed entirely of wool. It measures $2\frac{1}{2}$ inches in outer diameter by $2\frac{1}{4}$ inches in depth; the inner cup is $1\frac{3}{4}$ inches wide by 1 inch deep. It is very sparingly lined with fine grass tops and a few horsehairs, while a single well-preserved apple leaf lies perfectly flat and exactly in the center and bottom of the nest. It contained three eggs when taken, and bears not the slightest resemblance to any other nest of this species I have ever seen.

I believe that ordinarily but a single brood is raised in a season; but there are probably exceptions, as Mr. Frank H. Hitchcock informs me that at Somerville, Massachusetts, on September 8, 1890, he found a pair of Wood Pewees

caring for a brood of newly hatched young in a small grove near his home. If the first nest and eggs are taken they will promptly build a new one, and even a third, frequently in the same tree. An egg is deposited daily. Incubation lasts about twelve days. I have never seen the male assist in this duty, but he stays close by the nest and guards it. The young leave the nest in about sixteen days, and are cared for by both parents. From two to four eggs are laid to a set, generally three, and sets of four I consider rare. They usually start on their return migration in September, and I do not believe that any winter within our borders.

The eggs of the Wood Pewee vary in shape from ovate to short or rounded ovate; the shell is close-grained and without gloss. The ground color varies from a pale milky white to a rich cream color, and the markings, which vary considerably in size and number in different sets, are usually disposed in the shape of an irregular wreath around the larger end of the egg, and consist of blotches and minute specks of claret brown, chestnut, vinaceous rufous, heliotrope, purple, and lavender. In some specimens the darker, in others the lighter shades predominate. In very rare instances only are the markings found on the smaller end of the egg.

The average measurements of seventy-two eggs in the United States National Museum collection is 18.24 by 13.65 millimetres, or about 0.72 by 0.54 inch. The largest egg of the series measures 20.07 by 13.97 millimetres, or 0.79 by 0.55 inch; the smallest, 16.51 by 12.95 millimetres, or 0.65 by 0.51 inch.

The type specimen, No. 25414 (Pl. 2, Fig. 18), from a set of three eggs, taken by Dr. A. K. Fisher, near Sing Sing, New York, June 15, 1879, represents one of the larger and well-marked eggs of this species, while No. 25584 (Pl. 2, Fig. 19), from a set of three eggs, Ralph collection, taken near Holland Patent, New York, June 30, 1882, represents one of the smaller-sized and oddly marked specimens.

## 108. Contopus richardsonii (Swainson).

WESTERN WOOD PEWEE.

*Tyrannula richardsonii* Swainson, Fauna Boreali Americana, II, 1831, 146, Pl. 46, lower fig.

*Contopus richardsonii* Baird, Birds of North America, 1858, 189.

(B 138, C 255*a*, R 321, C 383, U 462.)

Geographical range: Western North America; north to British Columbia, the Provinces of Alberta and Saskatchewan, and probably farther in this direction; east to Manitoba, western North and South Dakota, western Nebraska, Kansas and Texas; south to Lower California, and in winter through Mexico and Central America to Ecuador and Bolivia, South America.

The Western Wood Pewee, also known as "Richardson's" and "Short-legged" Pewee, is a common summer resident and breeds in suitable localities throughout the western United States from the western edge of the Great Plains

to the Pacific Ocean. It ranges northward, as far as known at present, to British Columbia, Alberta, and northern Saskatchewan, and will probably be found in still higher latitudes. Southward it is found during the breeding season in Arizona, New Mexico, and western Texas, and in the mountain regions of Lower California. In eastern Manitoba, according to Mr. Ernest E. Thompson, it overlaps the range of the Wood Pewee, both species being found in the vicinity of Winnipeg, and it is not rare in other localities in this province. None winter within our borders.

In its general habits the Western Wood Pewee resembles the preceding species very closely, but not in its call notes. These are shorter, much harsher, and are uttered with much more emphasis—not in the plaintive, listless manner of the former. They resemble the sounds "pee-éé" or "pee-éér," occasionally varied to "pee-ah." Dr. James C. Merrill, United States Army, gives the note as "tweer" or "deer." On the whole, the Western Wood Pewee is not as often found in extensive forests as the preceding species. It prefers the less heavily timbered creek bottoms, the edges of mountain parks, and generally more open country, but avoids the dry, arid plains and desert regions. It has been found at altitudes up to 11,000 feet in summer.

Its food consists of insects of different kinds, and in southern California, Mr. F. Stephens informs me, this species is occasionally very destructive to honey bees. He says: "I have known apiarists to be compelled to shoot a great many to protect their bees; one in San Diego County told me that he shot several hundred in a season. They capture both workers and drones, and I have examined many stomachs which had stings sticking in them." Such conduct on their part is probably exceptional.

Dr. A. K. Fisher, in his Report on the Ornithology of the Death Valley Expedition, says: "One day, when the wind was very high, a number were seen sitting on the bare alkaline flats near Owens Lake, where they were picking up from the ground the flies which swarmed there, as grain-eating birds do seeds."[1]

Mr. R. H. Lawrence writes me: "At Humptulips, Washington, this Flycatcher would rarely come within proper range of my shotgun until well along in the morning, say half past 9 o'clock, when they came down lower in the trees. Probably they sought the upper stratum of air in the early hours because the sunlight set the insects stirring there before it did those of the undergrowth. This was seen to be so on my trips to the little prairies, where a comparatively extended view could be had. I noticed this in May and June, 1891."

The Western Wood Pewee arrives rather late on its breeding grounds; even in the southern portions of its range it is rarely seen before the last half of April, and not until a month later in the more northern localities, while nidification rarely begins anywhere before June 1.

Mr. Robert Ridgway makes the following statement regarding the position of the nests of the Western Wood Pewee: "The nest of this species, as is well

[1] North American Fauna, No. 7, 1893, p. 64.

known, differs very remarkably from that of *Contopus virens*, being almost invariably placed in the crotch between nearly upright forks, like that of certain *Empidonaces*, as *Empidonax minimus* and *Empidonax obscurus*, instead of being saddled upon a horizontal branch, etc."[1]

My observations regarding the position of the nest of the Western Wood Pewee are radically different from the above, and all that I have seen, some twenty in number, were saddled directly on limbs, or at points where branches forked, and never in crotches; and the seventeen specimens now before me were all similarly placed. Among these is one collected by Mr. Ridgway himself, No. 15200, United States National Museum collection, collector's No. 1282, from Parley's Park, June 25, 1869, which is catalogued in the above-mentioned report as "Nest in crotch of a dead aspen along stream," but which shows distinctly that it was saddled *on* a horizontal fork and not *in* an upright crotch. If the Western Wood Pewee places its nest occasionally in a crotch, which I do not deny, it is exceptional and not the rule, and the many records I have of its nesting from Texas, Arizona, Nevada, Utah, Colorado, California, and Oregon confirm my assertions fully, and show conclusively that this species does not differ in this respect from the Wood Pewee. The nests, however, do not resemble those of the former; they are better and more solidly constructed, and are usually deeper. The outer protective coating consisting of bits of lichens is dispensed with; decayed grass, wood, plant fibers, down, fine strips of the inner bark of juniper and sage, as well as the tops of wiry grasses, enter largely into their composition. These materials are compactly interwoven, and the outside of the nest is occasionally well covered with spider webs. They are usually lined with fine grass, down, and plant fibers, and rarely with a few feathers. A handsome nest, No. 24285, United States National Museum collection, taken May 31, 1891, by Capt. W. L. Carpenter, United States Army, near Prescott, Arizona, containing two eggs of this species and one of the Dwarf Cowbird, measures 2½ inches in outer diameter by 1¾ inches in depth; the inner cup is 2 inches wide by 1¼ inches deep. Although the walls of this nest are very thin, it is a well-built structure, and apparently stronger than many bulkier nests. It was placed on a limb of a cottonwood tree, about 10 feet from the ground.

Nests of this species may be looked for in pine, cottonwood, tamarack, aspen, alder, maple, oak, hackberry, ash, and orchard trees, from 6 to 40 feet from the ground. In the vicinity of Fort Klamath, Oregon, where it is a common summer resident, the nests were usually placed on horizontal limbs of black pine trees, both on live and dead ones, and in a single instance I found one in a small aspen. Among curious nesting sites the following are worth mentioning:

Mr. W. E. D. Scott found a nest and three eggs near Twin Lakes, Colorado, on July 11, 1878. The nest was built where three branches crossed, in a brush heap, 2 feet from the ground.[2]

[1] Explorations of the 40th Parallel, Vol. IV, 1877, p. 537.
[2] Bulletin Nuttall Ornithological Club, Vol. IV, 1879, p. 94.

Mr Charles E. Aiken states: "I have found several settled in the angle formed by the trunk of the tree and a horizontal branch, and in one instance, where a large limb had been torn from the tree by the wind, a nest was placed flatly upon a broad, board-like splinter."[1]

Mr. L. Belding, in his Birds of the Pacific District, 1890 (p. 99), makes the following statement: "It almost always places its nest on a dead horizontal limb, at least this is according to my observations, and I have seen many nests which were saddled on limbs. In a solitary instance, however, the nest was in or on horizontal diverging twigs in a deciduous oak, where it was partly hidden by foliage; again, one was nicely surrounded and to a great extent concealed by having been built in a bunch of yellow lichen (*Evernia*)."

Most of these birds nest in June; the earliest breeding record I have out of thirty-nine is May 31, from Prescott, Arizona. I believe that but one brood is raised in a season, although I have found nests with fresh eggs as late as July 15, probably second layings where the first had been taken or destroyed. The Western Wood Pewee is very much attached to its nesting site when one has been once chosen, and will frequently build a second nest in the same spot, or only change the location to some other limb of the same tree. It usually leaves its breeding grounds for the south in September.

The number of eggs to a set varies from two to four; sets of three are most often found, while those of four are very rare. They can not be distinguished from those of the preceding species, and the same description will answer for both, but they are a trifle smaller.

The average measurement of eighty-eight eggs in the United States National Museum collection is 17.97 by 13.61 millimetres, or about 0.71 by 0.54 inch. The largest egg of the series measures 19 05 by 15.24 millimetres, or 0.75 by 0.60 inch; the smallest, 16 by 12.95 millimetres, or 0 63 by 0.51 inch.

The type specimens, Nos. 20536 and 20541 (Pl. 2, Figs. 20 and 21), from the Bendire collection, were taken by the writer at Fort Klamath, Oregon, on Juy 7, 1882, and July 18, 1883, respectively, each set containing three eggs, and these represent the heavier and lighter colored patterns of markings, while No. 26063 (Pl. 2, Fig. 22), from a set of two eggs, taken near Santa Ysabel, California, by Mr. H. W. Henshaw, on June 9, 1893, represents an intermediate type of coloration.

[1] Surveys West of the 100th Meridian, Vol. V, 1875, pp. 354–355.

## 109. Empidonax flaviventris Baird.

YELLOW-BELLIED FLYCATCHER.

*Tyrannula flaviventris* Baird (W. M. & S. F.), Proceedings Academy Natural Sciences, Philadelphia, Pa., July, 1843, 283.
*Empidonax flaviventris* Baird, Birds of North America, 1858, 198.
(B 144, C 259, R 322, C 388, U 463.)

Geographical range: Eastern North America; north to the southern portions of Labrador and the Northeast Territory; west to Manitoba and Minnesota; south in winter through eastern Mexico and Central America to Panama. Casually to Greenland.

The Yellow-bellied Flycatcher is a summer resident in the northern forest and mountain regions of the United States, and breeds from Massachusetts and New York northward through the maritime provinces of the Dominion of Canada to southern Labrador and the Northeast Territory, where Prof. John Macoun reports this species as common about Lake Mistassinni, in latitude 51°, longitude 72° and 73°, and it probably passes beyond this point. It has also been recorded as breeding regularly in the Alleghany Mountains, in Pennsylvania, and probably will yet be found as a rare summer resident at points considerably farther south, as in the Smoky Mountains of North Carolina, etc. In the west it is recorded as a regular summer resident in eastern Manitoba and Minnesota, and probably breeds also in northern Wisconsin. It passes south in winter through eastern Mexico and Central America to Panama. Several specimens have been recorded from Greenland.

Within the limits of the United States the Yellow-bellied Flycatcher seems to be fairly common in the northern New England States, while in the Adirondacks and Catskills, in New York, it must be considered as rather rare. This apparent rarity is due perhaps more to its unobtrusive habits, its retiring nature, and favorite haunts during the breeding season; as it frequents the dark, moist recesses of the forests, which at this time of the year abound with biting insect pests of all kinds, and which for that reason are usually shunned by all but truly enthusiastic ornithologists and oölogists. As far as my observations go (and they are rather limited) I consider this species the most silent and retiring of all our Flycatchers, and, although it may be much more common in suitable localities during the breeding season than it appears to be, it is but rarely seen at this time unless accidentally flushed from its nest. In the Adirondack mountains, where I have met with it, it was observed only in primitive mixed and rather open woods, where the ground was thickly strewn with decaying, moss-covered logs and boles, and almost constantly shaded from the rays of the sun. The most gloomy-looking places, fairly reeking with moisture, where nearly every inch of ground is covered with a luxuriant carpet of spagnum moss, into which one sinks several inches at every step, regions swarming with mosquitoes and black flies, are the localities that seem to constitute their favorite summer haunts, and it is not surprising to me that the eggs of this Flycatcher are still

so rare in most oölogical collections. I have only been able to observe this species in the vicinity of its nest, and can not add much information in regard to its general habits. Its call note is a low, plaintive "peeh peeh," the last part more emphasized; another, an alarm note, sounds like "turri turri;" the same note I put down the previous season as "trehe-eh, trehe-eh," with the remark that it reminded me somewhat of the sound produced by sliding a finger over a violin string.

Its food probably consists exclusively of small insects, which certainly are abundant enough in the places frequented by it. It arrives on its breeding grounds in our Northern States during the last two weeks in May, and nidification usually begins about the second week in June, occurring somewhat later farther north.

We are indebted to Mr. H. A. Purdie for the first authentic description of the nest and eggs of the Yellow-bellied Flycatcher (see "Bulletin Nuttall Ornithological Club," Vol. III, 1873, pp. 166–168), and since then the correctness of his identification has been fully verified. Dr. A. K. Fisher took a handsome set of four eggs on June 26, 1882, in the Catskill Mountains, Ulster County, New York, near the summit of Slide Mountain, at an altitude of over 3,500 feet. These he generously presented to the United States National Museum, which was the first genuine set in this collection. The locality where it was found and the nest itself are thus described:

"On the slope whereon the birds had made their home an abundant growth of bright-green moss invested the rugged configuration of the surface and enfolded the scattered remains of trees—ancestors, perhaps, of the young growth of balsams which clustered about the spot and afforded seclusion to the little pair that had come among them. The nest was built in a cavity scooped in a bed of moss facing the side of a low rock. The cavity had been excavated to a depth of 2½ inches and was 2 inches across. The opening, but little less than the width of the nest, was 9 inches from the ground, and, partially hidden by overhanging roots, revealed the eggs within only to close inspection.

"The primary foundation of the nest was a layer of brown rootlets; upon this rested the bulk of the structure, consisting of moss matted together with fine-broken weed stalks and other fragmentary material. The inner nest could be removed entire from the outer wall, and was composed of a loosely woven but, from its thickness, somewhat dense fabric of fine materials, consisting mainly of the bleached stems of some slender sedge and the black and shining rootlets of, apparently, ferns, closely resembling horsehair. Between the two sections of the structure, and appearing only when they were separated, was a scant layer of the glossy orange pedicels of a moss (*Polytrichum*) not a fragment of which was elsewhere visible. The walls of the internal nest were about one-half an inch in thickness, and had doubtless been accomplished with a view of protection from dampness.

"Prof. Daniel C. Eaton, of New Haven, very kindly assumed the task of determining the different species of moss which entered into the composition

of the nest and of the moss bed in which it rested, and his investigation disclosed the fact that the mosses which abounded immediately about the nest had not been utilized as building material. As determined by Professor Eaton, the species of moss composing the bed were *Hypnum umbratum*, *Hypnum splendens*, *Hypnum schreberi*, *Hypnum crista-castrensis*. Those appearing in the nest were *Hypnum mullerianum*, *Hypnum muhlenbeckii* (?), *Dicranum longifolium*, *Dicranum flagellare*, *Polytrichum commune*, and *Polytrichum formosum*. With these occurred the following Hepaticæ: *Mastigobryum trilobatum*, *Scapania albicans*, and *Cephalozia bicuspidata*. In addition there were found among the materials of construction catkin scales of the birch, leaves of the balsam, and fragments of the dried pinnæ of ferns; but, as suggested by Professor Eaton, the presence of some of these was probably accidental. Springing from the verdant moss beds immediately about the nest were scattered plants of *Oxalis acetosella*, *Trientalis americana*, *Solidago thyrsoidea*, and *Clintonia borealis*."[1]

I am indebted to Dr. William L. Ralph for the opportunity of studying the nesting habits of this interesting Flycatcher. While on a tour of observation in the southwestern portions of the Adirondack mountains in Herkimer County, New York, while passing through a swampy piece of mixed woods which was free from undergrowth in this particular spot, but mostly covered with dense alder thickets in the immediate vicinity, a nest and four eggs of this species was found on June 17, 1892. The nest was placed among the upturned roots of a medium-sized spruce tree, to which considerable soil, which was entirely covered with a luxuriant growth of spagnum moss, was still attached. This perpendicular moss and fern covered surface measured about 6 by 8 feet. The nest was sunk into the moss and soil behind, about 14 inches above the ground; the entrance was partly hidden by some ferns and the growing moss around it, and, taken all in all, it was one of the neatest and most cunningly hidden pieces of bird architecture I have ever seen. I might have walked past a dozen times without noticing it. It contained four eggs, in which incubation was about one-third advanced. The entrance was nearly circular, and measured about 1¼ inches in diameter. The inner cup of the nest itself measured about 2 inches in diameter and 1¼ inches in depth. It was composed of fine grasses and a few black, hair-like rootlets and flower stems of mosses. A couple of days after finding this nest a Yellow-bellied Flycatcher was seen flitting about the upturned roots of a tree about 150 yards from where the first was taken, but a most careful search failed to reveal the location of the nest, if a second pair bred there.

On a subsequent visit to the same locality, on June 8, 1893, a second nest was found, containing two eggs; these were left until June 10, when there were four. This nest was placed not over 100 feet from the former, and was probably built by the same pair of birds which nested there the previous year. The nesting site was in a swampy wood, composed mostly of spruce and tamarack trees, in a slight hollow in the side of and at the foot of a small mound about one

[1] Transactions Linnæan Society, Vol. I, 1882, pp. 161, 162.

foot high, covered with spagnum moss, *Coptis trifolia*, *Oxalis acetosella*, and there were also a few other small plants growing from it. A single stem of a small bush protruded from the top of the opening. The hollow in which the nest was placed was lined with fine, dry grass and black, hair-like rootlets.

I think only one brood is raised in a season, as a most careful search failed to reveal a second nest in the vicinity. The birds were not seen afterwards, although the locality was visited several times. The return migration commences usually in the latter part of August, and none winter in the United States. Four eggs are ordinarily laid to a set; very rarely five. Their shape is usually ovate; the shell is close grained, rather frail, and without luster. The ground color is dull white, and the fine markings, which are usually minute and generally heaviest about the larger end of the egg, vary from cinnamon rufous to walnut brown; occasionally a specimen shows a speck or two of heliotrope purple.

The average measurement of sixteen eggs in the United States National Museum collection is 16.94 by 12.91 millimetres, or about 0.67 by 0.51 inch. The largest egg measures 17.53 by 13.21 millimetres, or 0.69 by 0.52 inch; the smallest, 16.26 by 12.70 millimetres, or 0.64 by 0.50 inch.

The type specimen, No. 25597 (Pl. 2, Fig. 23), Ralph collection, from a set of four eggs, was taken by Dr. William L. Ralph, June 17, 1892, near Wilmurt, Herkimer County, New York, and represents about an average-marked egg of this species.

## 110. Empidonax difficilis Baird.

WESTERN FLYCATCHER.

*Empidonax difficilis* Baird, Birds of North America, 1858, 198 (in text).
(B 144*a*; C 259, part; R 323; C 389; U 464.)

Geographical range: Western North America; east to the eastern foothills of the Rocky Mountains and adjacent ranges; north to southern Alaska; south to Lower California, and in winter through western Mexico to Costa Rica, Central America.

The breeding range of the Western Flycatcher, also known as the "Western Yellow-bellied" and "Baird's" Flycatcher, extends through western North America from Hot Spring Bay in southern Alaska (where Dr. T. H. Bean took a specimen on June 5, 1880, and informs me that it is not at all uncommon), through British Columbia and the Pacific Coast States, south to northern Lower California, Arizona, New Mexico, and probably western Texas, and in the interior, through Utah, Nevada, Idaho, western Montana, Wyoming, and Colorado.

Judging from the various records, the Western Flycatcher seems to be much more common in the coast districts west of the Sierra Nevada and Cascade ranges than in the interior, but it is also fairly common in Colorado, Arizona, and portions of New Mexico. Mr. R. S. Williams found it breeding in Belt Canyon, Montana, and kindly sent to the United States National Museum collection both skins and eggs from that locality.

Personally I have never met with this species in eastern Washington or Idaho; and only once near Fort Klamath, Oregon, where I found a nest, containing four half-grown young, among the roots of a spruce tree growing close to the banks of Anna Creek, a small mountain stream some 4 miles north of the fort, on July 6, 1882.

Mr. Charles A. Allen, of Nicasio, California, has kindly furnished me the following notes on the Western Flycatcher: "I find it a very widely distributed species throughout this part of the State, both among the forests on the highest hills, where there is not a drop of water for long distances, and along the banks of brooks and streams in the lowlands; in fact, anywhere where it can find shelter and shade, of which it is very fond. I have found its nests in all sorts of situations; sometimes in a small tree, placed in the upright forks of the main stem; again on the side of the stem, where a small stub of a limb or some sprouts grew out; or in a slight cavity in a tree trunk; against an old stump or a root which had been washed down during a flood in the middle of a stream; among curled-up roots near the water, etc. I have found a number of nests, when fishing for trout, by flushing the bird from under a bank; and on stooping down and looking I found the nest nicely concealed by the deep-green moss, such as covered the surrounding stones. They always use this particular kind of moss, no matter where the nest is placed. Occasionally they nest in deserted woodcutters' huts, in outbuildings near cover, and a friend of mine has some large water tanks in the woods back of his house, where for nineteen consecutive years these birds have built under the covered roofs of these tanks. I know of no place in this locality where they do not breed, excepting in very open country.

"Its song consists of a soft, low note. It shows much distress when its nest is taken, uttering then a low, wailing note, like 'pee-eu, pee-eu,' and frequently flutters about the person taking it and snapping its mandibles together. Its food consists of insects, which are caught by darting after them from its perch on some dead twig or limb, and it seldom fails to capture its victim."

Mr. H. P. Lawrence writes me: "I occasionally met with this species on the coast. In my diary I find this description of their call notes or song: June 14, 1891, at Quinnault Lake, Washington, 'pe-wit, pe-wit,' uttered energetically, or 'we-twee-eet,' with vigor. On June 26, 1891, at Humptulips, same State, they are put down as sounding like 'per-tee-t-weet,' or 'thweet'-put'-tweet',' uttered in jerky, spiteful accents."

In Belt Canyon, Montana, on July 6, 1889, Mr. R. S. Williams found the Western Flycatcher nesting in a narrow fissure of limestone, about 7 feet above the base of the wall. A nest observed by Mr. A. W. Anthony, near Howardsville, San Juan County, Colorado, on June 25, was placed on a ledge of rock, about 10 feet above a wagon road, and looked like a large ball of green moss, with a neat little cup in the center, lined with cow and horse hair. It contained a single egg when first found, and a set of four on July 3. Nests of this species have also been taken by Mr. Denis Gale on different occasions near Gold Hill,

Colorado. A nest and four fresh eggs, kindly presented by him to the United States National Museum collection, were found at an altitude of 9,500 feet, on June 27, 1889. It was placed in dense woods, 30 inches from the ground. Mr. A. M. Ingersoll reports finding a nest of this species at the bottom of a hole 5 inches deep, made by a Red-shafted Flicker in a live oak; nests have also been taken in piles of driftwood, on beams under bridges, etc. Dr. C. T. Cooke also found several of their nests and eggs near Salem, Oregon, in willow and cottonwood thickets.

The Western Flycatcher usually arrives in the more southern parts of its breeding range about April 1, and correspondingly later farther north. In the southern half of California it nests sometimes as early as the last ten days in April, but more frequently during the first week in May, while in the mountains of Colorado and Montana it delays nidification until the last half of June, and occasionally even later. I believe that in California two broods are sometimes raised in a season, and this Flycatcher will lay as many as four sets of eggs in a year, if those previously laid are taken.

A correspondent of the Nidiologist, writing from Alameda, California, and signing himself D. A. C[ohen], makes the following interesting statement in the December number, 1893, p. 51:

"In May of 1886 I found a nest of the Western Flycatcher, *Empidonax difficilis*, situated on a rafter in a cow barn and only 4 feet from the ground. As I approached closely to the nest four young birds of this species fluttered down to the ground and shuffled along and out of sight. In the bottom of the nest was a set of four eggs, which, upon being blown, showed that incubation had begun at different periods for each egg, but the embryos had not formed yet in any of them. Had the young birds not been disturbed they would have remained in the nest two or three days longer. The mother had deposited the eggs so the heat from the nestlings would save her about a week's time sitting on the eggs."

In the southern portions of their breeding range they rarely leave for their winter homes before the latter part of October. Mr. L. Belding states that he saw a specimen in San Diego County, California, in December, and thinks a few remain there during ordinary winters.

From what has already been stated it will be seen that the Western Flycatcher is not at all particular in the selection of a nesting site; it may be on the ground, well hidden from view, or in a tree, in a more or less exposed situation from 5 to 20 feet up.

The nest is composed of weed stems, dry grasses, plant fibers and down, strips of the inner bark of the redwood, fine rootlets, dead leaves, and bits of moss. It is usually lined with finer materials of the same kind, and occasionally with horse and cattle hair or a few feathers. The outside of the nest is usually coated with green moss when obtainable, but some nests before me show no trace of this in their composition. They are generally placed not far from water, but there are exceptions to this. A well-preserved nest now before me, taken by

Mr. R. S. Williams on July 6, 1891, in Belt River Canyon, Montana, measures 4 inches in outer diameter by 2 inches in height. The inner cup measures $2\frac{1}{4}$ inches by $1\frac{3}{4}$ inches deep. It is a rather loosely built structure, and a good deal of moss enters into its construction. Three or four eggs are laid to a set, usually four; I know of a single instance only of five having been taken.[1]

The eggs vary in shape from ovate to short and rounded ovate; the shell is smooth, close grained, and without luster. The ground color is usually dull white or pale creamy white, and the eggs are blotched and spotted with cinnamon rufous and lighter shades of buff pink. In the majority of specimens these markings are heaviest about the larger end, but in a few they are more evenly distributed over the entire egg. While they resemble the eggs of the Yellow-bellied Flycatcher considerably, and are of nearly the same size, the spots are, as a rule, coarser and heavier.

The average measurement of fifty-eight eggs in the United States National Museum collection is 16.86 by 13.12 millimetres, or about 0.66 by 0.52 inch. The largest egg of the series measures 18.80 by 13.72 millimetres, or 0.74 by 0.54 inch; the smallest, 15.24 by 12.45 millimetres, or 0.60 by 0.49 inch.

The type specimen, No. 24960 (Pl. 2, Fig. 24), from a set of four eggs, Ralph collection, taken near Haywards, California, June 4, 1882, represents one of the smaller and lightly marked eggs, while No. 25072 (Pl. 2, Fig. 25), from a set of three, taken by Mr. William G. Smith, near Pinewood, Colorado, June 12, 1890, shows a larger-sized and heavier-marked specimen.

## III. Empidonax cineritius Brewster.

ST. LUCAS FLYCATCHER.

*Empidonax cineritius* Brewster, Auk, V, Jan., 1888, 90.
(B —, C —, R —, C —, U 464, 1.)

Geographical range: Lower California.

Very little is yet known about this recently described species. It appears to occur only in the Peninsula of Lower California. The type was obtained at La Laguna, and since then specimens have also been taken on Santa Margarita Island, Comondu, and San Benito. Mr. W. A. Anthony writes me that he found the St. Lucas Flycatcher abundant along the willow-lined streams of the San Pedro Martir Mountains in the spring of 1893, and quite rare in the mesquite thickets in an *arroya* near the old mission of San Fernando, not far from San Quentin, Lower California, evidently nesting, but as no nests and eggs could be found, they still remain unknown, and nothing farther has yet been recorded about its habits, etc.

[1] See Bulletin Nuttall Ornithological Club, Vol. VI, 1881, p. 119.

## 112. Empidonax acadicus (Gmelin).

ACADIAN FLYCATCHER.

*Muscicapa acadica* Gmelin, Systema Naturæ, I, ii, 1788, 947.
*Empidonax acadicus* Baird, Birds of North America, 1858, 197.
(B 143, C 256, R 324, C 384, U 465.)

Geographical range: Eastern North America; north to southern New England, southern New York, Pennsylvania, southern Michigan, Wisconsin, and Minnesota, to southern Manitoba; west to eastern Nebraska, eastern Kansas, the eastern parts of the Indian Territory, and Texas; south in winter through eastern Mexico and Central America to Ecuador, South America, and the Island of Cuba.

The breeding range of the Acadian Flycatcher, also known as the "Green-crested Flycatcher," extends from Florida and our Southern States bordering the Gulf coast, north to southern New York, the lower Hudson River Valley, and possibly occasionally to the Connecticut River Valley in southern New England, the greater part of Pennsylvania, Ohio, southern Michigan, Wisconsin, and Minnesota, to the Province of Manitoba Dominion of Canada. In the West it reaches to eastern Nebraska, eastern Kansas, the Indian Territory, and somewhat beyond the eastern half of Texas, where Mr. H. P. Attwater found it breeding on the Medina River, 15 miles south of San Antonio, Texas, in June, 1891, and sent me the nest, which unquestionably is of this species. Mr. Frank M. Chapman found it breeding near Gainesville, Florida, taking a nest and two half-incubated eggs on May 9. Dr. Leverett M. Loomis reports it as a common summer resident in Chester, Greenville, and Pickens counties, South Carolina. The late Dr. William C. Avery stated that it is common in southern Alabama. It is known to breed in Louisiana and eastern Texas, and may be called fairly common in suitable localities throughout our Middle States. The northern limits of its breeding range are not as positively established as they might be, due to the fact that this species is often mistaken for *Empidonax pusillus traillii*, which it somewhat resembles, as do the eggs, but there is no resemblance in the nests.

Dr. A. K. Fisher found the Acadian Flycatcher a regular summer visitor in the vicinity of Sing Sing, New York, and took several nests and eggs there, which are now in the United States National Museum collection; this locality marks about the most northern point of its range in the east. I believe, however, that it occasionally breeds still farther north in this State, as Mr. W. F. Webb sent me a nest and three eggs which he identified as belonging to this species, taken July 4, 1891, near Meridian, Cayuga County, New York. The nest certainly looks like a typical one of *Empidonax acadicus*, and there is a skin now in the United States National Museum collection, taken at Amsterdam, Montgomery County, New York, June 5, 1885, which further confirms this supposition. In Pennsylvania it is a common summer resident, and also in southern Michigan, where the late Capt. B. F. Goss found it breeding, and whence

he sent a nest and a set of eggs to the Museum collection. Mr. J. W. Preston writes me that it is common in Hardin County, Iowa, describing the nest as a frail, semipensile structure, fastened to a fork near the extremity of drooping branches, 6 or 8 feet from the ground, and formed of vines of *Lathyrus*, interwoven with a few grasses and oak catkins, fastened with spider webs, in thick underbrush, but near openings. Dr. P. L. Hatch states that it is fairly common in Minnesota. Mr. Ernest E. Thompson, in his "Birds of Manitoba," gives it as quite common in the vicinity of Duck Mountain, and Col. N. S. Goss, in his "Birds of Kansas," says: "Not uncommon in the eastern part of the State," and he also records it from eastern Nebraska.

The Acadian Flycatcher is one of the later migrants to arrive on its breeding grounds, and none winter within our borders. It reenters the United States from its winter haunts usually about the middle of April, and moves leisurely northward, arriving on its breeding grounds in the more northern portions of its range during the last half of May. In the mountain regions of Pennsylvania, the Virginias, North Carolina, etc., it is rarely found above an altitude of 3,000 feet. The favorite summer haunts of this species are generally deep, shady, second-growth hard-wood forests, on rather elevated ground, especially beech woods with little undergrowth, or bottom lands not subject to periodical overflow, and not far from water. In such localities its peculiar call notes, resembling "wick-up" or "hick-up," interspersed now and then with a sharp "queep-queep" or "chier-queep," the first syllable very quickly uttered, and another, somewhat like "whoty, whoty," may be frequently heard; but the bird, although not particularly shy, is rarely seen while moving through the dense foliage of the lower limbs from tree to tree. I have several times failed to detect the bird when I was perfectly certain it was within 20 feet of me.

Like nearly all Flycatchers, the Acadian is rather unsociable and quarrelsome with its own kind, especially during the mating season. Its food consists almost entirely of small insects, which are caught on the wing and rarely missed, and to a small extent only on wild berries. It is an extremely beneficial species, doing no harm whatever, and deserves the fullest protection.

In our Northern States nidification rarely commences before June, while in the more southern States it nests sometimes during the first week in May. In the vicinity of Washington, District of Columbia, where the Acadian Flycatcher is a common summer resident, it usually breeds during the first ten days in June. Their favorite nesting sites are in drooping branches of various sorts of trees and bushes, mostly beech, witch-hazel, dogwood, sweet gum, hickory, and oak, and less often in wild crab apple, hawthorn, hemlock, pine, cypress, willow, and birch trees, at heights ranging from about 4 to 20 feet from the ground. The nests, many of which are rather shallow, open-work, sieve-like structures, are semipensile, their upper rims being attached to the fork of some slender twig, like the nests of the *Vireos;* but do not resemble these in any other respect, and show great variation in size and in the character of the materials of which they are built. In the South many are constructed almost exclusively of Spanish moss;

in the North the body of the nest is composed principally of decayed fibrous material, dark-colored rootlets interwoven with a few blades of grass, catkins, dry blossoms, and usually decorated more or less abundantly with the male aments or catkins of oak or other trees. There really is no inner lining, and the bottom of the nest is usually so thin that the eggs can very readily be seen through it from below. In some nests the outer decorations of catkins are omitted, and the walls are composed of fine weed stems, silky plant fibers, and fine strips of bark, mixed with plant down, cocoons, and spider webs. This style of nest is apparently considerable stronger than the former, and usually somewhat larger. A rather well-built specimen, taken by Mr. Charles W. Richmond, June 14, 1885, near Washington, District of Columbia, measures 2¾ inches in outer diameter by 2 inches in depth, while another, already mentioned as taken by Mr. H. P. Attwater on the Medina River, Texas, measures likewise 2¾ inches in outer diameter, but only 1¼ inches in depth; the inner cavity is only 2 inches wide and about three-quarters of an inch deep. There are several other nests in the collection equally shallow. Attached as they are to slender, drooping branches, it is surprising how the eggs are prevented from rolling out in a heavy wind storm unless the parent is on the nest. Occasionally one is found which has some of the materials of which it is built hanging down from the sides, giving it a very untidy appearance.

Mr. Witmer Stone showed me a very peculiar nest of this Flycatcher which he took on the lower Susquehanna River, in York County, Pennsylvania, in June, 1890. It was situated on the extremity of a low branch of a hemlock tree, about 6 feet from the ground, and was constructed entirely of the long, gray lichen, *Usnea barbata*. In fact, there are three distinct types of these nests; the first and most common one is more or less abundantly decorated with the male aments of different species of trees; a second, in which these exterior ornamentations are dispensed with, and the last, where the nest is built entirely, or in large part, of different kinds of tree mosses. Occasionally the Acadian Flycatcher builds a double nest—for instance, when a Cowbird has deposited an egg in one just completed, before the owner has laid in it. Mr. W. E. Loucks, of Peoria, Illinois, sends me such a record. The nest found by him contained a Cowbird's egg in the lower story and three fresh eggs in the upper one. The Acadian Flycatcher is one of the species on which this parasite imposes occasionally. I believe that but one brood is raised in a season. During the latter half of September the return migration to their winter homes commences.

The number of eggs to a set varies from two to four, while sets of three are most often found; but sets of four in certain sections of its range, in Pennsylvania for instance, are said to be not especially rare; an egg is deposited daily. In shape they range from ovate to an elliptical ovate; the shell is close grained, and occasionally slightly lustrous. The ground color varies from pale cream to buff color, and the markings consist of moderate-sized spots, and again of mere specks, ranging from liver brown and ferruginous to a light rufous tint. None of the eggs are heavily spotted, and most of these markings are generally concentrated about the larger end of the egg. Occasionally one is almost entirely unspotted.

The average measurement of seventy-six eggs in the United States National Museum collection is 18.37 by 13.53 millimetres, or about 0.72 by 0.53 inch. The largest egg of the series measures 20.07 by 14.73 millimetres, or 0.79 by 0.58 inch; the smallest, 16.76 by 12.70 millimetres, or 0.66 by 0.50 inch.

The type specimen, No. 24816 (Pl. 2, Fig. 26), from a set of three eggs, taken by Mr. G. E. Mitchell, June 13, 1888, near Washington, District of Columbia, represents one of the lighter-colored and least-marked specimens, while No. 24949 (Pl. 2, Fig. 27), also from a set of three eggs, Ralph collection, taken May 23, 1880, near Washington, Pennsylvania, represents about an average egg of this species.[1]

## 113. Empidonax pusillus (Swainson).

LITTLE FLYCATCHER.

*Platyrhynchus pusillus* Swainson, Philosophical Magazine, I, May, 1827, 366.
*Empidonax pusillus* Cabanis, Journal für Ornithologie, 1855, 480.
(B 141, C 257*a*, R 325, C 386, U 466.)

Geographical range: Chiefly western and portions of eastern North America; north to southern British Columbia and the northern border of the western United States, in the drier and more open districts; east to about the eastern limits of the Great Plains and the Mississippi Valley, in Arkansas, Missouri, Illinois, Indiana, and probably still farther in this direction, as well as in most of the intervening regions; south in winter through the Mississippi Valley, Texas, and Mexico, to Central America.

The breeding range of the Little Flycatcher, also known as the "Little Western Flycatcher," extends north to the interior of southern British Columbia, and sporadically farther east to the northern border of our adjoining States, in Idaho, Montana, and western North Dakota. Still farther east it reaches the western portions of North and South Dakota, the greater part of Nebraska, portions of Kansas, Missouri, Arkansas, Illinois, and probably to southern Indiana and Ohio; while to the southward it is found in all the intervening country, including California, Arizona, New Mexico, northern and western Texas, and portions of the Indian Territory, excepting the dry and arid desert regions.

The Little Flycatcher is an abundant summer resident in all suitable localities throughout the western United States, its favorite haunts being the willow-covered islands and the shrubbery along water courses, beaver meadows, and the borders of the more open mountain parks; in such places it sometimes reaches an altitude of 8,000 feet in summer, especially in California, Colorado, and Utah. It is pretty generally distributed at this time through Washington, Oregon, Idaho, Utah, Nevada, California, Montana, Wyoming, Colorado, New Mexico, Arizona, and western Texas, and it probably also breeds in the higher mountains of Lower California. I have found this species in many

[1] Mr. William Brewster has recently conclusively demonstrated that the name of *Empidonax virescens* (Vieillot) will have to be substituted for that of *Empidonax acadicus* (Gmelin), see "The Auk," Vol. XII, 1895, pp. 157–159.

localities in the West, but it was especially common in the vicinity of Fort Klamath, Oregon, where I took a number of its nests and eggs.

Dr. Clinton T. Cooke has kindly sent me the following notes on this species, based on observations made by him in the vicinity of Salem, Oregon, during the years 1888 to 1891. He writes: "The Little Flycatcher arrives at Salem about May 20, and for a week or two is very silent, seldom seen, and rather inclined to seek the heavy undergrowth along water courses, where I have found it silently but industriously capturing insects, much as the Western Flycatcher (*Empidonax difficilis*) does later in the season. About June 1 they begin to frequent the more open places, old pastures grown up with rosebushes, the small islands, and the gravel bars covered with a dense growth of small willows—in short, any open place near water where there is a growth of bushes from 3 to 8 feet high. Their numbers increase in the open localities until the middle of June, decreasing at the same time, and finally disappearing altogether from the woods. As their numbers increase in the open places they become pugnacious, and their shrill, sharp notes can be heard constantly. Their note, given only during the breeding season, resembles the syllables of 'pree-pe-deer,' delivered rather hurriedly and shrill. This call is quite characteristic of the energetic, aggressive disposition of the bird. In July, 1891, I heard it several evenings in the twilight, and once while out late in the night. As might be expected, the male calls incessantly in the early twilight.

"Construction of the nest begins soon after June 10, and ordinarily consumes about a week, so that one may begin to search for sets of fresh eggs by the 20th of the month. Along the Willamette River the nest is usually placed in a small clump of willow bushes, preferably a bush well covered with cotton, and it is apt to be pretty well concealed in an upright crotch, about 4 feet from the ground, sand, or gravel, as the case may be. I have found only one nest in a rose bush, on a bar where willows were common enough. One nest which I found was placed in a slender willow, fully 18 feet from the ground, in an upright crotch; another was placed in a willow bush growing in the water, and was taken from a canoe, and several were placed within a foot of the sand or gravel. The material uniformly used as a foundation for the nest is the inner bark of small dead willows which have been killed by high water and subsequently bleached by the weather, some fine rootlets, a little fine dead grass, a lining of cotton down, with occasionally a piece of string and a few horsehairs. This is often an artistic structure, but sometimes only a loose flimsy affair. Once I have seen as nice a lining of horsehair as a Lazuli Bunting could put in; twice a lining of fine rootlets, once one of green grass, and once one of fine green rushes, which were common in that locality."

Dr. Cooke's observations agree with my own; but at Fort Klamath, Oregon, the Little Flycatcher, besides nesting in willows, is also rather partial to small aspens. In California, in the Santa Clara Valley, they occasionally build in blackberry bushes, and Mr. A. W. Anthony found several nests near Beaverton, Oregon, placed in the forks of rank ferns from a foot to 20 inches above the

ground. In Colorado Mr. Denis Gale has found this species breeding in small alder bushes. A nest and five eggs, one of these being the egg of a Cowbird, were taken by him July 2, 1889, at an altitude of 5,500 feet, and presented to the United States National Museum collection; and in Colorado the Little Flycatcher seems to be not infrequently imposed upon by this parasite, as he has taken several nests containing one of their eggs.

Until quite recently the birds found breeding throughout the Mississippi Valley, in Missouri, Illinois, etc., have generally been referred to *Empidonax pusillus traillii*, and my attention was first drawn to this discrepancy by Dr. A. K. Fisher, who showed me a perfectly typical breeding female taken by Mr. W. S. Catleigh, near Canton, Illinois, on June 25, 1894, which is clearly referable to *Empidonax pusillus*, and other such instances have since then come under my observation, establishing without a doubt the correctness of the Doctor's views, and compelling me to rewrite my articles on these birds. Although not quite positive regarding the Ohio birds, I feel certain that these will also be found to be referable to this species, and the subjoined notes from some of my Eastern correspondents are all much more likely to refer to *Empidonax pusillus* than to *Empidonax pusillus traillii*, but I prefer not to alter them.

Mr. Lynds Jones, of Oberlin, Ohio, writes me: "I have lived in a locality where Traill's Flycatcher was common. I met with it first on the site of an old locust grove where the young sprouts were allowed to grow up; the ground was low and marshy, and elder and willow bushes grew in profusion, together with *Ambrosia* here it nested in willows close to the ground. Later I learned to look for this bird elsewhere, and found it also in thickets of hazel and small shrubs, often a quarter of a mile from water, where the nest was placed in the darkest parts of these thickets. I also found it nesting commonly in white-willow hedges and in the shrubbery found along the banks of streams. If possible, thickets are selected where cattle do not run, so that vines and bushes are permitted to grow in wild profusion, and in such localities wild-plum bushes are frequently used as nesting sites. The nest is usually placed from 18 inches to 5 feet from the ground and well concealed. Its call note, sounding like 'whee-chéé,' is uttered at short intervals during the mating season, and at longer intervals in the summer."

Mr. W. E. Loucks, of Peoria, Illinois, writes me: "Traill's Flycatcher is a common summer resident here, very abundant in the river bottoms, but it is also found sparingly in the uplands. I consider it a somewhat silent bird, frequenting the thick growths of small trees which either grow in or near the water or in damp situations. It is most abundant in the heavy growth of willows in the bottoms, and many nest here."

Mr. Robert Ridgway tells me that in southern Illinois it frequents rather open prairie country interspersed with low shrubbery. Mr. Otto Widmann, of St. Louis, Missouri, in a letter to Dr. Elliott Coues, published in the "Bulletin of the Nuttall Ornithological Club" (Vol. V, 1880, p. 22), makes the following statement: "It is common almost everywhere outside the forest, not only along

the 'willow thickets bordering streams and swamps,' but even here in the city, in all large gardens, parks, orchards, pastures, cemeteries, etc. *Trailli* is not the shy or retiring bird of some Eastern writers; its movements are not 'hidden by the foliage of trees,' as its station is generally on a prominent point, often the very top of a shrub or tree, or a telegraph wire, a fence, or a weed stalk."

The Little Flycatcher, according to my observations in the West, is not nearly as shy a bird as its eastern representative, and while on the whole it also probably prefers moist situations, like Traill's Flycatcher, it seems to be equally as well satisfied in rather dry country, where the other is apparently never found. One of their common call notes sounds like "queet-queet," and the alarm note uttered when the nest is approached is something like that of Traill's Flycatcher, "whuish-whuish." When pursuing each other during the mating season, they sometimes give vent to a twittering note, not unlike that of the Arkansas Flycatcher, and a sharp "quéét-quéét" is often heard while these restless little beings flit about in the low willows, or when perched on some tall weed or coarse marsh-grass stalk. They never remain long in one place, but move from perch to perch, snapping up insects as they fly; they are pugnacious, quarrelsome little creatures, making up in courage and determination what they lack in size. I have seen one drive a Red-shouldered Blackbird away from the vicinity of its nest, pitching down on it angrily and pecking at its head and neck in the manner of its larger relatives when chasing Crows or Hawks. They do no harm and deserve the fullest protection.

Nidification always commences late, even in the more southern portions of their range; in the vicinity of Tucson, Arizona, for instance, I found two nests with fresh eggs on June 16 and 20, 1872, which is about the time it begins nesting at Fort Klamath and in the Willamette Valley, Oregon; and it is not unusual there to find fresh sets of eggs during the first week in July. Lieut. H. C. Benson, United States Army, took a nest of this species containing three fresh eggs at Sequoia National Park, Tulare County, California, on July 13, 1892, in a locality where it was not likely the bird had been robbed before.

The description of the nest already given by Dr. Cooke applies to a typical one, which is always built in a crotch or among young sprouts growing up from the limb, at a height of 1 to 18 feet from the ground, averaging from 4 to 8 feet. From their position these nests are usually cone shaped. Occasionally one is found which is completely covered on the outside with plant down, probably of one of the cottonwoods or some species of willow, while the inner cup of the nest is lined with fine shreds of bark, plant fibers, and fine grasses. Where this species nests in the vicinity of houses, as it frequently does in the eastern parts of its breeding range, pieces of twine, rags, newspapers, and feathers are frequently incorporated into the body and walls of the nest, while the inner cup is generally lined with the tops of fine grasses, shreds of bark, hemp-like fibers, especially those of the milkweed, horsehair, and occasionally feathers. A well-preserved nest of this species, No. 24111, United States National Museum collection, taken by Mr. Denis Gale, near Gold Hill, Colorado, on July 3, 1890,

one of the most compactly built ones, measures 3½ inches in outer diameter by 4 inches in depth; the inner cup is 2 inches wide by 2 inches deep. In some specimens the outer walls are fully an inch thick.

The Little Flycatcher occasionally builds a double nest. Dr. Clinton T. Cooke writes me: "On June 20, 1891, I found a nest on Hammer's Island, in the Willamette River. It was situated in a willow crotch, about 4 feet from the ground; contained no eggs and presented nothing abnormal to view. I was prevented from making a second visit to the nest until July 6, when I supposed it would contain either young or badly incubated eggs. I was much surprised, however, to find that it looked abnormally deep outside. The cavity was about the usual depth, but from the bottom to the margin of this the nest measured about 5 inches, and resembled an inverted cone, presenting no irregularities from apex to base. It contained four fresh eggs. On examining it more closely I saw it was a two-storied nest, one neatly built upon the other. The lower one also contained four eggs, the contents of which were too dry to be removed, and which evidently had been abandoned for some inexplicable cause."

The number of eggs to a set varies from two to four, usually three or four; sets of the latter number are oftener found in the more northern parts of its range than the smaller number; and an egg is deposited daily. Only one brood is raised in a season, and incubation lasts about twelve days; the young are fed on insects of various kinds, and remain in the nest about two weeks. The return migration to their winter homes usually begins in the more northern portions of their range about the first week in September, and none winter within our borders.

The eggs are usually ovate in shape; the shell is strong and without luster. The ground color varies from a pale creamy white to pale buff, and this is moderately spotted with vinaceous rufous and ferruginous. The markings are principally confined to the larger end of the egg, and vary from small rounded dots to larger irregular blotches among the finer ones. In some specimens the ground color might be called dead white.

The average measurement of one hundred and twenty-nine eggs in the United States National Museum collection is 17.86 by 13.39 millimetres, or about 0.70 by 0.53 inch. The largest egg of the series measures 19.56 by 13.97 millimetres, or 0.77 by 0.55 inch; the smallest, 15.49 by 12.70 millimetres, or 0.61 by 0.50 inch.

The type specimens, Nos. 25228 and 25229 (Pl. 2, Figs. 28 and 29), both taken from sets of four eggs which were collected by Dr. Clinton T. Cooke, near Salem, Oregon, on June 22 and July 2, 1891, are selected to show the extremes in coloration and markings, and were presented for that purpose.

## 114. Empidonax pusillus traillii (Audubon).

TRAILL'S FLYCATCHER.

*Muscicapa traillii* Audubon, Ornithological Biography, I, 1832, 236.
*Empidonax pusillus* var. *traillii* Baird, Brewer and Ridgway, History of North American Birds, II, 1874, 369.
(B 140, C 257, R 325*a*, C 385, U 466*a*.)

Geographical range: Eastern and portions of western North America; north to Nova Scotia, New Brunswick, the southern portions of Quebec, northern Ontario, and in the interior of the Dominion of Canada, from Manitoba, Assiniboia, Alberta, and British Columbia north to about latitude 63°, in the Mackenzie River Valley and southern Alaska; west in the United States to eastern North and South Dakota; south in winter through Texas and Mexico to Central America.

The breeding range of Traill's Flycatcher, the eastern race of the Little Flycatcher, but not always readily distinguishable from it, extends from southern New England, central and northern New York (the mountainous portions of northern Pennsylvania?), northern Michigan, Wisconsin, Minnesota, and eastern South Dakota, or from the southern border of the Canadian fauna northward as indicated, reaching the northern limits of its breeding range in the vicinity of Fort Simpson, Northwest Territory, and in southern Alaska, where it appears to be rare, however. I consider this subspecies as being strictly a bird of the Canadian fauna, and do not believe that it breeds south of these limits. In the southeastern portions of its breeding range, in New York and northern Connecticut, Traill's Flycatcher is mainly found among alder thickets bordering the numerous small mountain streams, or in rather wet meadows covered in places with undergrowth of willow, etc. In the Adirondack Mountains, in Herkimer County, New York, Traill's Flycatcher is not an uncommon summer resident, very shy, and much oftener heard than seen. In the vicinity of Wilmurt this subspecies was only observed in the alder swamps and in beaver meadows, was very shy and retiring, and therefore seldom seen, for instead of perching on some dead twig or branch, like most of our Flycatchers do, it kept hidden among the foliage as much as possible. One of its notes, generally uttered during the breeding season when sitting at rest on some twig in the top of a bush, resembles the "pree-pe-deer" of the Little Flycatcher very much; another, the syllables "huip, huip;" and the alarm note is something like "whuish, whuish," uttered quickly and emphatically, being difficult to reproduce on paper.

Mr. F. A. Patton found Traill's Flycatcher breeding in Miner County, South Dakota, on June 30, 1892, and sent me one of the parents for identification, which I consider to be referable to *Empidonax pusillus traillii*.

Mr. J. Lockhart, of the Hudson Bay Company, has sent several sets of its eggs, with the parents, to the United States National Museum, from Fort Resolution, Great Slave Lake, the most northern breeding record I have. It appears to be a common summer resident in British Columbia, ranging from the coast eastward throughout the intervening British provinces, excepting a few of the

more open, sagebrush-covered valleys in the interior, where it seems to be replaced by *Empidonax pusillus*, or intermediates, which are not readily referable to either form. In fact, the differences between these birds are, at best, but very slight, and the easiest solution would be to recognize only one species.

Traill's Flycatcher usually makes its appearance in the more southern parts of its breeding range about the latter part of May or during the first ten days in June, and correspondingly later farther north. While collecting in company with Dr. William L. Ralph, in the vicinity of Wilmurt, Herkimer County, New York, on June 23, 1893, we found a nest of this subspecies in a swampy pasture, placed in a small arrow-wood bush about 2½ feet from the ground.

The nest of Traill's Flycatcher resembles that of the Little Flycatcher very much, and, like it, is nearly always built in a crotch formed by two or more twigs growing out from the main stem; occasionally it is placed on a horizontal limb, at a point where several smaller twigs spring out perpendicularly from it; around these the walls of the structure are often woven. As a rule they are well constructed, the materials used varying somewhat in different localities, dry grasses, pine needles, shreds of bark, and plant fibers usually constituting the body of the nest, the inner cup being lined with fine grass tops, shreds of bark, vegetable fibers, fern down, and occasionally with a few horsehairs. A typical nest measures about 3 inches in outer diameter by 2½ inches in height; the inner cup is about 2 inches wide by 1¾ inches deep; the materials composing it are well interwoven with each other; the outer walls are thick, and, as a rule, it is well concealed.

I have seen it stated that Traill's Flycatcher occasionally builds a semipensile nest, like the Vireos, but I have never seen any, and such instances, if they really occur, must be rare. Its nest appears invariably to be placed in low shrubs or bushes near water, and rarely over 6 feet from the ground, more often from 1 to 4 feet.

Nidification begins late in the season, about a week being consumed in nest building. The eggs, from two to four in number, usually three, although sets of four are not uncommon, are deposited daily. In the more southern parts of their range fresh eggs may be looked for in the last half of June, while in the more northern portions, generally during the first two weeks in July.

A single brood is raised in a season, incubation lasting about twelve days. The Cowbird occasionally deposits an egg in the nest. The young are fed on insects, and leave the nest in about two weeks. The return migration to the south begins sometimes in the latter part of August, but usually during the first half of September, and none winter within our borders. The eggs are mostly ovate in shape; the shell is close grained and without luster. The ground color ranges from a pale creamy white to a pale pinkish buff. The markings vary considerably in size from minute dots and specks to bold spots and blotches of cinnamon rufous, ferruginous, and claret brown, and they predominate mostly about the larger end of the egg, in some cases forming an irregular wreath. A few specimens are very slightly marked and appear almost immaculate. On

the whole, they resemble very closely the eggs of the preceding species, as well as those of *Empidonax acadicus*, but they average a trifle larger.

The average measurement of fifty eggs in the United States National Museum collection is 18.54 by 13.46 millimetres, or 0.73 by 0.53 inch. The largest egg of the series measures 19.81 by 13.97 millimetres, or 0.78 by 0.55 inch; the smallest, 17.27 by 12.70 millimetres, or 0.68 by 0.50 inch.

The type specimen, No. 24992 (Pl. 2, Fig. 30), from a set of three eggs, Ralph collection, was taken by Dr. William L. Ralph, near Wilmurt, Herkimer County, New York, June 22, 1891, and represents about the ordinary style of markings found among the eggs of this subspecies.

## 115. Empidonax minimus Baird.

LEAST FLYCATCHER.

*Tyrannula minima* Baird (W. M. & S. F.), Proceedings Academy Natural Sciences, Philadelphia, July, 1843, 284.
*Empidonax minimus* Baird, Birds of North America, 1858, 195.
(B 142, C 258, R 326, C 387, U 467.)

Geographical range: Eastern North America; north in the eastern parts of the Dominion of Canada to about latitude 49° 30′, and in the interior through the Provinces of Manitoba and Saskatchewan to Great Slave Lake and the southern Mackenzie River Valley, Northwest Territory, to about latitude 63°; west to the eastern slopes of the Rocky Mountains; casually to Utah; south in winter through Central America to Panama.

The breeding range of the Least Flycatcher, also known as the "Chebeck," extends through the northern parts of the eastern United States, from about latitude 40° northward into the Dominion of Canada, through Nova Scotia, Cape Breton, Prince Edward Island, New Brunswick, the southern portions of the Provinces of Quebec and Ontario, to about latitude 49° 30′, and thence westward through Manitoba and Saskatchewan, in the interior, north to Great Slave Lake and the southern Mackenzie River Valley, Northwest Territory, to about latitude 63° N.

The western limits of its breeding range in the United States are not yet well defined. It is known, however, to extend to Tom Green County, Texas, where Mr. William Lloyd reports it as a "tolerably common summer visitant; abundant in fall; have shot young; no nests taken." (See "The Auk," Vol. IV, 1887, p. 193.) A young bird of the year, taken there on August 15, 1885, and now in the United States National Museum collection, seems to confirm this statement, and another specimen, taken by Dr. H. B. Butcher, on August 3, 1866, near Laredo, Texas, carries its probable breeding range still farther south and west. As far as I am aware, no records of its breeding in Kansas have been recorded, but it is said to nest occasionally in eastern Nebraska. It is known to be a common summer resident in the Dakotas, and I took a single nest and eggs on June 25, 1885, near Fort Custer, Montana; and two skins taken by me near the same place are now in the United States National Museum collection.

Mr. H. W. Henshaw also took a specimen near Denver, Colorado, on May 17, 1873, and I believe more careful investigation will yet show that the Least Flycatcher is an occasional summer resident as far west as the eastern foothills of the Rocky Mountains.

The most southern breeding record in the eastern United States I have been able to find is one by Mr. John C. Cairns, in Buncombe County, North Carolina, where he reports it as rare, stating: "I have seen but one pair, and found their nest. It was placed in the fork of a persimmon tree, 20 feet from the ground, and contained four fresh eggs." It also breeds sparingly throughout the mountain regions of southern Pennsylvania, the Virginias, etc.

Mr. Witmer Stone writes me from Philadelphia, Pennsylvania, under date of April 21, 1892: "I recently received a nest and eggs of *Empidonax minimus* from near Trenton, New Jersey, which I believe is the most southern record of the breeding of this species in New Jersey."

Mr. S. N. Rhoads also records this species as nesting in Delaware County, Pennsylvania, on June 1, 1881, securing the parents.[1]

It is a common summer resident throughout the whole of New England, New York, northern Pennsylvania, northern Illinois, Indiana, Iowa, Michigan, Wisconsin, and Minnesota, as well as in the southern portions of the Provinces of Ontario and Saskatchewan. Neither does it appear to be rare still farther north, as there are several breeding records by Messrs. R. Kennicott and J. Lockhart from Fort Resolution, Great Slave Lake; by Mr. B. R. Ross, from Fort Simpson, and by Miss Elizabeth Taylor, near Lake Athabasca, all in the Northwest Territory.

The Least Flycatcher arrives at its summer haunts in the more southern parts of its range about the second week in May, and is the commonest of our smaller *Tyrannidæ*. It prefers the more open and cultivated country to the forests, and is only found on the outskirts of these. Like many other species, it readily adapts itself to the changed conditions of things, and is equally well contented in the immediate vicinity of human habitations, and even in villages, as in more retired places. Its favorite resorts are orchards, hedgerows, the shade trees and shrubbery along country roads, small streams, pastures, etc. A person will not have to search long in such places to find it, or at least to hear its familiar "che-beck," which in an early morning's walk can be heard in every orchard and from almost every clump of trees bordering the roads and lanes. It is a most restless little creature, now flitting from branch to branch of an apple tree, peering here and there, then suddenly darting after some insect which it has disturbed by its movements, uttering constantly a sharp "twit, twit, twit" as it moves about, varied with its ordinary call of "che-beck," which it never seems to tire of uttering; another one of its notes sounds something like "s-lick, s-lick." During the mating season the male may sometimes be seen hovering over a tree in which its mate is hidden, uttering at the same time a low, twittering warble, like "whit-we-we;" at this time it is scarcely ever at

[1] Bulletin Nuttall Ornithological Club, Vol. VII, 1882, p. 55.

rest, and either its wings or tail are in constant motion. Where not molested it soon becomes very tame and fearless.

Mr. Manly Hardy writes me: "A pair of these birds or their descendants have nested regularly in or near my garden, usually building in a maple. These birds know me, and, what is more, I believe remember me from one year to another. They often sat on a dry twig, or on a bean pole near by, and watched me hoe, and suddenly one would dart down and catch a moth or other insect which I had disturbed, flying so close to me that I could distinctly hear the sharp snap of its bill. It then almost invariably returned to the place it darted from to eat its prey. Both birds often came close to the window and watched my family inside."

Although small and insignificant in size, our Least Flycatcher is by no means a coward, and will boldly attack animals much larger than itself in the defense of its nest and young. I have seen one give chase to an inquisitive red squirrel, which is one of the greatest enemies our small birds have during the nesting season, drive it promptly out of the tree in which its nest was placed, and follow it persistently until it had left the neighborhood. Although quarrelsome enough among themselves, they rarely molest other small birds, and breed in apparent harmony among them.

Its food consists principally of small insects of various kinds, and occasionally of berries; it does no harm, and deserves the fullest protection. Nidification in the southern portions of its breeding range begins usually about the first week in June, and somewhat later farther north; at Fort Custer, Montana, for instance, the single nest I found there contained but slightly incubated eggs on June 25, 1885.

Apple orchards seem to furnish their favorite nesting sites in New England and central New York; maple, oak, willow, alder, tamarack, spruce, locust, beech, and other trees are also more or less used. The nest, a neat and compact structure, is usually placed in an upright fork of a small tree or sapling, from 8 to 25 feet from the ground, and is outwardly composed of shreds of bark, plant fibers, dry grass, weeds, thistle, cottonwood and fern down, pieces of string, feathers, shreds of rope, spider webs, and empty cocoons; the inner lining usually consists of fine plant fibers, especially those of the milkweed, horsehair, fine grass, shreds of the inner bark of willow, cottonwood, cedar, and other trees, feathers, thistle, willow, and cottonwood down, etc. Occasionally a nest is saddled on a horizontal limb of a tree. While out with Dr. William L. Ralph, in the vicinity of Wilmurt, New York, on June 10, 1893, we found a nest of this Flycatcher saddled on a limb of a young spruce, about 10 feet from the ground and 6 inches from the trunk, in a small swamp. The nest contained four nearly fresh eggs, and the female had commenced sitting. She seemed but little concerned at our intrusion, and remained in the vicinity, uttering the usual "che-beck" and now and then a low "twit."

An average nest measures about 3 inches in outer diameter by $2\frac{1}{2}$ inches in depth; the inner cup, about 2 inches in diameter by $1\frac{1}{2}$ inches deep. It seems

to take fully a week or more to complete the nest. The female performs the duties of incubation almost exclusively, and this, as nearly as I have been able to determine, occupies about twelve days. The return migration to their winter home in Central America usually begins about the middle of September, none remaining in our Southern States.

The eggs vary from three to six in number, usually four, and one is deposited daily. They are short and rounded ovate in shape; the shell is strong and thick for its size, and without lustre. The ground color is pale creamy white, and they are unspotted. The Cowbird imposes its eggs on several of our smaller Flycatchers, including occasionally the one now under consideration.

The average measurement of eighty-five eggs in the United States National Museum collection is 16.14 by 12.70 millimetres, or about 0.64 by 0.50 inch. The largest egg of the series measures 17.02 by 12.95 millimetres, or 0.67 by 0.51 inch; the smallest, 15.24 by 11.43 millimetres, or 0.60 by 0.45 inch.

The type specimen, No. 24993 (Pl. 2, Fig. 31), from a set of four eggs, from the Ralph collection, was taken by Dr. William L. Ralph, near Holland Patent, New York, on June 3, 1882, and represents an average egg of this species.

## 116. Empidonax hammondi (Xantus).

HAMMOND'S FLYCATCHER.

*Tyrannula hammondi* Xantus, Proceedings Academy Natural Sciences, Philadelphia, May, 1858, 117.

*Empidonax hammondi* Baird, Birds of North America, 1858, 199.

(B 145, C 260, R 327, C 390, U 468.)

Geographical range: Western North America; east to the eastern slopes of the Rocky Mountains and adjacent ranges; north through British Columbia to Alaska, and to Little Slave Lake, southern Athabasca, latitude 55° 20′ (as far as known), and probably still farther in this direction; south in winter to Lower California and southern Mexico.

The breeding range of Hammond's Flycatcher, which appears to be the western representative of *Empidonax minimus*, is still very indifferently defined. It is only known positively to breed in Colorado, California, Washington, British Columbia, and southern Athabasca, in the Dominion of Canada, but its summer range undoubtedly also extends through the higher mountain regions of New Mexico, Arizona, Utah, Wyoming, Montana, Nevada, Oregon, and Idaho. Throughout our Western States it has thus far been met with chiefly during its migrations, and comparatively few thoroughly identified nests and eggs have yet been taken. I have seen this species in May near Fort Klamath and Camp Harney, Oregon, but I am almost sure none remained in the vicinity to breed. The birds which stay with us during the summer appear to retire mostly to the higher mountain valleys, at altitudes of from 5,000 to 10,000 feet. This accounts for the few nests and eggs which have thus far been discovered within our borders; and the fact that it is also a very shy and silent bird partly accounts for its rarity as well.

Mr. H. W. Henshaw says: "Hammond's Flycatcher, in the west, is one of the most silent and retiring of birds, leaving the low country entirely in summer, and finding in the glens and recesses of the pine woods of the mountains or the alpine streams, with their fringes of alders, its chosen retreats. As I have noticed them, nearly all of the dash and spirit characterizing this group is wanting, though, of course, the difference is merely one of degree. After snapping up a passing insect it resumes its perch upon some low limb and remains nearly motionless for a time, giving an occasional listless jerk of the tail. The notes are very feeble, the most so of any Flycatcher I am acquainted with, and consist of a soft 'pit,' varied with a low, lisping whistle."[1]

Mr. Denis Gale, of Gold Hill, Colorado, kindly sent to the United States National Museum a handsome nest and four eggs (No. 24112) of this species, taken near the above locality, at an altitude of 10,000 feet, on June 27, 1890. These eggs were slightly incubated; the female was also secured, and is now in the same collection. The nest was saddled on a horizontal limb of a spruce tree, 3 feet from the trunk and 14 feet from the ground. It is outwardly composed of old weed stems, decayed plant fibers, shreds of bark, and a little plant down, and is lined with fine grass tops, shreds of bark, plant down, hair, and a few feathers. The outer diameter is $4\frac{1}{2}$ inches by $1\frac{3}{4}$ inches deep; the inner cup measures $2\frac{1}{4}$ inches in width by $1\frac{1}{4}$ inches in depth. It is a compact and well-built structure, and does not resemble any of the nests of the other members of this genus. It was placed among a lot of smaller twigs growing out of a limb, among which it is well secured. From its position and general make-up it resembles a nest of the genus *Contopus* much more than one of *Empidonax*. Another nest, also from Mr. Gale (No. 23695), containing young when found on July 24, 1888, and taken in the same locality, was placed near the top of a tall spruce, about 30 feet from the ground, and was not concealed. The nest is a compact one and saddled on a fork; it is composed externally of decayed vegetable fiber, and lined with finer materials of the same description, plant down, and fur. It is shallow, being about $1\frac{3}{4}$ inches deep by $2\frac{1}{2}$ inches wide; the inner cavity is very large, while the sides of the nest are exceedingly thin; it is fully 2 inches wide inside by 1 inch deep.

Mr. L. Belding, writing of this species, says: "By no means rare during the migrations. Instead of being a common summer resident of the pine forests of the Sierra, as I stated in the 'Proceedings of the United States National Museum, 1879,' I now think it a rare summer resident. The only nest I found was on June 6, 1880, at Big Trees, Calaveras County, California. This was on a horizontal limb of a living pine, 40 or 50 feet from the ground and partly hidden by foliage. It was very wide in proportion to its depth. By shooting it down the eggs were destroyed. The female was shot as she flew from the nest, and was sent to the Smithsonian Institution. A few remain in this latitude as late as September 15, arriving from the South about May 1."[2]

[1] Surveys West of the 100th Meridian, Vol. V, 1875, p. 362.
[2] Land Birds of the Pacific District, 1890, p. 103.

Among Mr. Belding's field notes, which he kindly placed at my disposal, I find the following description of this nest:

"It appeared to be nicely made of much the same materials as are used by *Contopus richardsoni*, but is much wider than the nest of the latter species, having a width of not less than 4 inches. The outer wall was noticeably convex."

While on a visit to Seattle, Washington, in May, 1894, Mr. S. F. Rathbun told me of finding a nest situated on a small limb of a fir near Lake Washington, during the previous season, which he thought belonged to this species, but he did not secure one of the birds. He found a similar nest this season, on July 1, 1894, also placed on a small limb of a fir about 50 feet from the ground. It was built at a point on the limb where a small twig branched out, being partly saddled and partly crotched. After watching the bird go several times to the nest, he shot it and sent it to me for fuller identification; it proved to be a Hammond's Flycatcher beyond a doubt, as he had previously surmised.

Hammond's Flycatcher is evidently a very common summer resident in central British Columbia, where Mr. R. MacFarlane took a number of its nests in the vicinity of Stewart's Lake, in June, 1889, and the United States National Museum was favored with several sets of eggs, nests, and the parents belonging to them, all of which proved to belong to this species. Some of these nests were apparently placed in upright crotches of willows, and others on horizontal limbs close to the trunks of small conifers, at no great distance from the ground. The earliest of six breeding records from this vicinity is June 4; the latest, June 22. The nests differ somewhat from those previously described as far as the inner lining is concerned. In three of these the bottoms are covered with scales of buds of conifers, and the sides are lined with fine plant fibers, shreds of bark, plant down, and bits of hypnum moss in fruit.

Mr. Charles A. Allen writes me that he found Hammond's Flycatcher nesting in Blue Canyon, Placer County, California, at an altitude of about 5,000 feet, the nests were placed on horizontal limbs, well out, in shady places in the pine forests of the Sierra Nevadas.

The number of eggs laid to a set is usually three or four. The shell is strong, close-grained, and without luster. They vary in shape from short ovate to elongate ovate. The ground color is pale, creamy white, and the majority of the eggs are unspotted. In the small series before me there are, however, two sets which are spotted. In the set of four eggs taken by Mr. Gale every egg is marked, and the same is the case with a set of three eggs taken by Mr. R. MacFarlane. Mr. Gale made the following remarks about the set taken by him: "The eggs are very interesting; a decided light-yellow ground, with a slight powdering of dark specks, with larger shell markings of lavender tints." The spots or specks on all the specimens are exceedingly minute, and are also few in number, well rounded in outline, and mostly distributed about the larger end of the egg; they are of a liver-brown color. The lighter lavender-colored shell markings referred to by Mr. Gale are barely visible now, having faded out.

The average measurement of sixteen eggs in the United States National Museum collection is 16.84 by 12.90 millimetres, or about 0.66 by 0.51 inch.

The largest egg measures 17.78 by 13.72 millimetres, or 0.70 by 0.54 inch; the smallest, 15.24 by 12.70 millimetres, or 0.60 by 0.50 inch.

The type specimen, No. 24112 (Pl. 2, Fig. 32), from a set of four eggs from Boulder County, Colorado, was taken by Mr. Denis Gale on June 27, 1890, and presented to the Museum collection; it represents a spotted specimen.

## 117. Empidonax wrightii Baird.

WRIGHT'S FLYCATCHER.

*Empidonax wrightii* Baird, Birds of North America, 1858, 200 (in text). Cf. Brewster, Auk, VI, April, 1889, 89.
(B 146, C 261, R 328, C 391, U 469.)

Geographical range: Western United States; north to Montana, Idaho, Oregon, and probably Washington; east to the eastern slopes of the Rocky Mountains and adjacent ranges; south in winter to Lower California and southern Mexico.

The breeding range of Wright's Flycatcher extends through the mountainous portions of Arizona, New Mexico, and California, northward through the mountains of Colorado, Utah, Nevada, Idaho, and Wyoming to Montana, Oregon, and probably Washington. Like the preceding species Wright's Flycatcher retires to the higher mountain parks during the season of reproduction, and rarely breeds below an altitude of 4,000 feet; in Colorado it has been found nesting up to 10,000 feet. Its favorite resorts at this time are the shrubbery near mountain brooks, the aspen and pine groves usually found at the borders of mountain prairies, rather wet beaver meadows, and the edges of swamps. In northeastern Arizona Mr. H. W. Henshaw found it among the oak openings during the summer, and in the vicinity of Santa Fe, New Mexico, he met with it on the barren piñon-clad hills, where no deciduous vegetation was found; but such a summer habitat must be considered as rather an exceptional one.

Wright's Flycatcher is a very common summer resident in the mountain valleys and parks of the Cascade Range, in southern Oregon, and I have found many nests of this species at Fort Klamath, also in the Des Chutes River Valley and along the tributaries of this stream. It arrives on its breeding grounds at Fort Klamath about May 15, and nidification usually begins a month later. I do not consider this species as noisy as the Little Flycatcher, which was nearly as common, but its notes are very similar; in fact they are not easily distinguishable, but are given with less vigor than those of the former, while in its actions it is fully as energetic and sprightly as any of the species of the genus *Empidonax*.

Mr. R. S. Williams writes from Columbia Falls, Montana: "Wright's Flycatcher is very common here, being by far the most abundant Flycatcher observed. The first arrival this spring was noted May 7, and the next day they were abundant. They seem to be about equally distributed in all kinds of timber, and their notes are more frequently heard all through the day than those of any other bird."

Mr. F. Stephens informs me that he considers this species only as a migrant in southern California, but possibly a few may breed in the pine regions.

In Calaveras County, California, Messrs. L. Belding and J. Clarence Sperry found it common and breeding in the fir forests of the Sierra Nevada Mountains, the nests usually being placed in manzanita, hazel, dogwood, and other shrubs; and both have sent nests and eggs to the National Museum. Mr. Robert Ridgway collected several nests and eggs in the East Humboldt Mountains, and near Austin, Nevada, as well as in Parley's Park, in the Wasatch Mountains, Utah, where this species was very common. The nests were all placed in aspens, excepting one taken near Austin, Nevada, on July 3, 1868, which was found in a mountain mahogany bush on the extreme summit of a hill, at an altitude of about 9,000 feet, and another in Parley's Park, on June 28, 1869, in a service-berry bush. In New Mexico, Arizona, and Colorado it appears to be somewhat rarer during the breeding season.

Mr. Denis Gale found a nest and four eggs, on July 22, 1888, in Boulder County, Colorado, at an altitude of about 10,000 feet; these he presented to the United States National Museum collection. The nest was placed about 30 inches from the ground, against the trunk of a spruce bush, at the edge of a small clump of these trees. Mr. A. W. Anthony took one near Silverton, San Juan County, Colorado, on June 27, which also contained four fresh eggs, and describes the nest as composed of silvery-white strips of the inner bark of a willow, lined with fine grass stems and cattle hair. The nest looked like an inverted cone, and was fully 8 inches in length by 4 in diameter at the largest part. It was fastened about 4 feet from the ground to an almost upright willow, apparently tied on with spiders' silk alone, but was partly supported by a fork at the top.

I found my first nest of this species near the banks of the Des Chutes River, Oregon, on June 12, 1882; it was placed close to the trunk of a small pine sapling, about 5 feet from the ground. It contained three eggs, in which incubation had commenced. The female remained on the nest until I almost touched her with my hand, she then flew off and alighted in another small pine a few feet away, and uttered a few low notes like "tweer-tweer." Subsequently, during this and the season of 1883, I found some twenty-five nests, which were nearly all placed in similar situations, against the trunks of small saplings, such as pine, aspen, alder, or willow, the first two being seemingly preferred, or in upright forks in bushes, such as laurel or service berry, and from 2 to 18 feet from the ground. It also nests occasionally in wild-plum bushes and in buck brush.

One of the neatest nests I have seen of this species was taken by me July 5, 1882, on the side of the mountain east of Fort Klamath, Oregon, this being the only one I did not find in the valley. It was placed in a good-sized laurel bush (*Kalmia*), in a stout three-pronged fork, about 2 feet from the ground. It measures $3\frac{1}{2}$ inches in outer diameter by $2\frac{1}{2}$ inches in depth; the inner cup is $1\frac{7}{8}$ inches wide by $1\frac{1}{3}$ inches deep. Exteriorly it was composed entirely of decayed plant fibers, which were compactly interwoven with each other, and the inside was warmly lined with feathers of the Sooty Grouse, Yellow Warbler, and other

birds. Some of these nests resemble a blunt inverted cone; these usually measure about 3 inches in outer diameter and about 3½ inches in depth; the inner cup is about 1⅞ inches in diameter by 1½ inches in depth. Nearly every one is partially lined with feathers and cattle hair, and occasionally bits of fine tree moss enter into the composition of the nest. They are always well built and securely fastened to the twigs among which they are placed.

Although Wright's Flycatcher appears to have not yet been taken in Washington, I am quite confident that it will be found there in suitable localities, such as the Blue Mountains, for instance, where scarcely any collecting has yet been done.

Nidification rarely commences before the middle of June, more frequently during the last third of this month, and sometimes not before the first week in July. It takes fully a week to construct the nest, and I believe the male assists in incubation, which lasts about twelve days. The food consists, at this time of the year at least, entirely of insects. Only one brood is raised in a season, and the return migration usually begins in the vicinity of Fort Klamath, Oregon, in the latter part of August, when it commences to leave for the warmer lowlands. Some remain in portions of southern California throughout the winter. The number of eggs to a set is three or four; about one set in three, according to my observations, contained four eggs, one being deposited daily. A second set is frequently laid when the first is taken, and the new nest is often placed close to the former site. The eggs are usually short or rounded ovate in shape; the shell is strong, close grained, and without luster, dull white or pale creamy white in color, and unspotted.

The average measurement of one hundred and eleven eggs in the United States National Museum collection is 17.22 by 13.27 millimetres, or about 0.68 by 0.52 inch. The largest egg of the series measures 18.54 by 14.22 millimetres, or 0.73 by 0.56 inch; the smallest, 15.24 by 12.19 millimetres, or 0.60 by 0.48 inch.

The type specimen, No. 20480 (Pl. 2, Fig. 33), from a set of three eggs, Bendire collection, was taken by the writer near Fort Klamath, Oregon, June 24, 1882, and represents an average egg of this species.

## 118. Empidonax griseus Brewster.

GRAY FLYCATCHER.

*Empidonax griseus* Brewster, Auk, VI, April, 1889, 87.
(B —, C —, R —, C —, U 469 1.)

Geographical range: Lower California and southern Sonora, Mexico.

Very little is yet known about the range of the Gray Flycatcher, recently described by Mr. William Brewster from specimens taken by Mr. M. Abbott Frazar, near La Paz, Lower California. It is a somewhat larger and grayer

bird than Wright's Flycatcher, and appears to replace this in the regions where it is found. Nothing is as yet known about its breeding habits, nest, or eggs. It has been taken at Triunfo, San Jose del Cabo, and on Santa Margarita Island, Lower California, at Alamos, in southern Sonora, and it probably also occurs in the mountains of southern Arizona.

## 119. Empidonax fulvifrons (Giraud).

FULVOUS FLYCATCHER.

*Muscicapa fulvifrons* Giraud, Sixteen Texas Birds, 1841, Pl. II.
*Empidonax fulvifrons* Sclater, Proceedings Zoological Society, 1858, 301.
(B —, C —, R 329, C —, U [470].)

Geographical range: Eastern Mexico and southern Texas.

Since Giraud's description of the Fulvous Flycatcher, in his paper on "Sixteen Texas Birds," published in 1841, no other specimens, as far as I have been able to learn, have been taken either in eastern Mexico or along our southern border, in the lower Rio Grande Valley of Texas. The type still remains unique, and nothing is known about its nesting habits.

## 120. Empidonax fulvifrons pygmæus (Coues).

BUFF-BREASTED FLYCATCHER.

*Empidonax pygmæus* Coues, Ibis, 1865, 537.
*Empidonax fulvifrons pygmæus* Ridgway, Proceedings U. S. National Museum, VIII, 1885, 356.
(B —, C 262, R 329*a*, C 392, U 470*a*.)

Geographical range: Northern Mexico; north to southwestern New Mexico and Arizona.

The breeding range of the Buff-breasted Flycatcher appears to extend through northern Mexico northward into southwestern New Mexico and the southern half of Arizona. This subspecies was first added to our fauna by Dr. Elliott Coues, who obtained it near Fort Whipple, Arizona, on May 9, 1865, which point probably marks the northern limits of its range in the United States. Since then it has been taken near Inscription Rock, New Mexico, and at Camp Apache, Arizona, by Mr. H. W. Henshaw, who published the following: "Apparently a very rare species, as it was met with on but two occasions. At Inscription Rock, New Mexico, July 24, 1873, I observed a pair of old birds feeding the young. These latter were nearly full fledged and had evidently been raised in the immediate vicinity. In September a single immature bird was taken near Camp Apache, Arizona, on a small brush-lined stream in a heavy pine forest. Judging from the individuals seen, their habits differ in no noteworthy respect from those of the small Flycatchers generally. * * *

"During the past season I saw several individuals of this species, but not till well down into the southern part of Arizona. I am inclined to think that it will not be found to occur much, if any, north of the thirty-fourth parallel, and that south of this it is a regular summer resident, though certainly far from common. In all its motions it is a perfect *Empidonax*."[1]

Dr. A. K. Fisher, who met with the subspecies among the scrub oaks in the Chiricahua Mountains, in June, 1894, informs me that one of the notes resembles closely the chirp of Audubon's Warbler.

Mr. F. Stephens obtained this Flycatcher in the Santa Rita and Chiricahua mountains, Arizona, and in the mountains north of Fort Bayard, New Mexico, in 1876 and 1880, but was unable to find either the nest or eggs, both of which, as far as I am aware, still remain unknown.

## 121. Pyrocephalns rnbineus mexicanus (Sclater).

VERMILION FLYCATCHER.

*Pyrocephalus mexicanus* Sclater, Proceedings Zoological Society, 1859, 45.
*Pyrocephalus rubineus* var. *mexicanus* Coues, Key, 1872, 177.
(B 147, C 263, R 330, C 394, U 471.)

Geographical range: From Guatemala through Mexico and Lower California to the southern border of the United States, including southern Texas, southwestern New Mexico, Arizona, and southern California; north to southwestern Utah, and probably southern Nevada.

The breeding range of the Vermilion Flycatcher is coextensive with its distribution in the United States, excepting possibly southern California, where I believe it has not yet been found nesting, though several specimens have been taken there during the winter. Mr. F. Stephens met with this handsome Flycatcher in the San Gorgonio Pass, and others are known to have been taken near the Santa Anna River, in Los Angeles County, and at the mouth of the Santa Clara River, in the vicinity of Santa Buenaventura, California, which are the most western records I have been able to find for this species. Mr. Stephens writes me as follows on this subject: "I consider all birds of this species found west of the immediate neighborhood of the Colorado River as stragglers, and do not know of a breeding record west of the Colorado River bottom."

It seems rather strange that it should be found only as a rare winter visitor in southern California, but from present information this seems to be the case.

The northern range of the Vermilion Flycatcher has recently been extended into southwestern Utah, where Dr. C. Hart Merriam shot an adult female at St. George, in the lower Santa Clara Valley, on May 13, 1891. In "North American Fauna, No. 7" (p. 66), he states: "She was killed in an orchard at Dodge Spring, about a mile from the settlement, and contained large ova nearly ready

[1] Surveys West of the 100th Meridian, Vol. V, 1874, p. 364.

for the shell. This record extends the known range of the species very materially, since it had not previously been recorded north of Fort Mohave, Arizona."

The Vermilion Flycatcher appears not to be particularly rare in the lower Rio Grande Valley, in the vicinity of Brownsville, Texas, where Dr. James C. Merrill, United States Army, found several of their nests and eggs, which are now in the United States National Museum collection; it also occurs in other places along our southwestern frontier. Its center of abundance within our borders, however, must be looked for in southern Arizona. Here, in the vicinity of Tucson, along the banks of Rillito Creek (one of the many dry streams of this country, where the water flows above ground for about one month in the year, and digging has to be resorted to to lead it out of its sandy bed, and where, unless this is done, small stagnant pools are only occasionally met with) I found this pretty and conspicuous little Flycatcher to be a rather common summer resident, and located some two dozen of its nests and eggs during the season of 1872. Although an occasional specimen can be found here throughout every month of the year, comparatively few of these birds remain during the winter. The first migrants usually return about March 1, the males preceding the females about a week, and by the 10th of the month both sexes are common.

The mating season commences shortly afterwards, and the males, in their handsome red plumage, may be seen hovering in the air, some 20 to 30 feet above the ground, poised and fluttering their wings in the manner of a Sparrow Hawk. During this performance every feather of the body, and even the tail, is raised, and it seems a difficult matter for the bird to keep itself properly balanced. At this time it repeatedly utters a shrill note like "zi-bréé, zi-bréé," and snaps its mandibles together, slowly descending to its perch again, usually on some small limb of a mesquite or other tree near water. It is a very comical-looking little object at such times, and is evidently proud of its handsome appearance. When at rest, perched on some twig overhanging the creek bed, it utters a whining sort of note occasionally, not unlike that of the Western Wood Pewee.

Its food consists of insects, which are mostly caught on the wing; but I have also seen it alight on the ground to pick up a grasshopper or small beetle, returning to its perch afterwards, beating its prey against it, and devouring it at leisure. Its favorite resorts are the shrubbery found along water courses in the more level, open country, but it also follows the canyons into the foothills of the mountains, up to an altitude of between 4,000 and 5,000 feet. I have rarely found it at any great distance away from water. In southern Arizona nidification seldom begins before April 20, and usually not until May 1.

The nest is a rather frail, shallow, and flimsy affair, and is always saddled on a horizontal fork, well out from the trunk of the tree, as is that of the Wood Pewee. The foundation is composed of a thin layer of twigs from 2 to 3 inches in length; the sides are constructed of small weed tops, a species of *Evax*, plant fibers, empty cocoons, spider webs, plant down, etc. The whole is rather loosely held together. The inner lining consists most frequently of feathers, sometimes of a little wool, cattle hair, fur, or plant down. The rims of some nests are

decorated with a few lichens, but such ornamentations are rather unusual, as far as my observations go. The outer diameter of an average-sized nest is about $3\frac{1}{4}$ inches by $1\frac{1}{4}$ inches in depth; the inner, 2 inches by three-fourths of an inch in depth, barely deep enough to keep the eggs from rolling out.

In southern Arizona their nests may be looked for in mesquite trees, cottonwoods, oaks, and rarely in willows, all the nests examined by me being placed on forks of horizontal limbs, from 8 to 50 feet from the ground, generally from 10 to 18 feet up. Dr. J. C. Merrill found it nesting in retama bushes, *Parkinsonia aculeata*, in Texas, rarely over 6 feet from the ground. I found my first nest of three fresh eggs on April 27, 1872, and the latest on July 16. This contained two fresh eggs, and one of the Dwarf Cowbird, which occasionally lays in the nest of this species, two such instances having come under my observation.

Dr. J. C. Merrill, in his notes on the "Ornithology of Southern Texas," says: "A nest of this species, found May 10, 1877, contained a young Dwarf Cowbird and three addled eggs, which latter I removed. On revisiting the same nest ten days later I found three fresh eggs, on which the female was sitting. As the young Cowbird could not have been fledged by this time, it would seem as if the Flycatchers, on finding that their eggs had been removed, had thrown out the parasite egg and laid again."[1]

An egg is deposited daily, and incubation lasts about twelve days; in this the male assists to some extent, as I have on two occasions seen one sitting on the eggs. I believe two broods are occasionally raised in a season. On June 6 I found a nest of the Vermilion Flycatcher in a small grove of cottonwood trees, with no other shrubbery nearer than 600 yards; it was placed on a horizontal fork of one of these trees, about 20 feet from the ground, and contained three fresh eggs; close by the male was feeding a full-grown young bird; no other pair appeared to occupy this grove, and it seems very probable that it belonged to these birds. The fact that I also found fresh eggs as late as July 16 further strengthens this supposition. The majority of these Flycatchers return to their winter homes in Mexico during the latter part of October.

From two to three eggs are laid, generally three. I never found more in a nest. They are usually short and rounded ovate in shape; the shell is close grained and lusterless. The ground color varies from pale cream to buff, and the markings, which are generally heaviest about the larger end of the egg, consist mostly of bold, irregular blotches and spots of clove and sepia brown, drab, and lavender gray. The egg does not resemble that of any of our Flycatchers, and is a handsome and striking one. Occasionally a specimen is found in which the markings are small and nearly evenly distributed over the entire surface, and in others they form a well-defined wreath, leaving both ends almost immaculate.

The average measurement of fifty eggs in the United States National Museum collection is 17.48 by 13.05 millimetres, or about 0.69 by 0.51 inch. The largest egg of the series measures 18.54 by 13.97 millimetres, or 0.73 by 0.55 inch; the smallest, 15.75 by 12.70 millimeters, or 0.62 by 0.50 inch.

[1] Proceedings U. S. National Museum, Vol. I, 1878, p. 142.

The type specimen, No. 20423 (Pl. 2, Fig. 34), from a set of three eggs, Bendire collection, one of the smaller and lighter-marked eggs, was taken by the writer near Tucson, Arizona, June 1, 1872; No. 21036 (Pl. 2, Fig. 35), also from a set of three eggs, represents one of the larger and more heavily marked specimens. It was taken by Dr. James C. Merrill, United States Army, near Brownsville, Texas, May 29, 1877.

## 122. Ornithion imberbe (Sclater).

BEARDLESS FLYCATCHER.

*Camptostoma imberbe* Sclater, Proceedings Zoological Society, 1857, 203.
*Ornithion imberbe* Lawrence, Ibis, 1876, 497.

(B —, C —, R 331, C 393, U 472.)

Geographical range: Central America and eastern Mexico; north to the lower Rio Grande Valley, Texas.

The Beardless Flycatcher, one of the smallest of the *Tyrannidæ* found within the borders of the United States, was added to our fauna by Mr. G. B. Sennett, who took a specimen near Lomita Ranch, Texas, on April 24, 1879, where it appears to be a rather rare summer visitor. Mr. Sennett makes the following remarks: "I have little to say of the habits of this species. My single specimen was shot on April 24 in a low bush distant from woods. No others were observed. It was an adult male, in fine plumage, and its testes showed the breeding season to be close at hand. Its diminutive size and yellow commissure led me at first to think it the young of some other species, but I fortunately perceived my error, and was careful to preserve what proves to be the best find of the trip, one which adds to our fauna a new genus and species never suspected to occur so far north."[1]

I believe the nest and eggs of this interesting little Flycatcher still remain unknown.

## 123. Ornithion imberbe ridgwayi Brewster.

RIDGWAY'S FLYCATCHER.

*Ornithion imberbe ridgwayi* Brewster, Bulletin Nuttall Ornithological Club, VII, October, 1882, 208.

(B —, C —, R —, C —, U 472*a*.)

Geographical range: Northern Mexico, from Puebla and Jalisco; north to southern Arizona.

Ridgway's Flycatcher is another comparatively recent addition to our fauna, and was first described by Mr. William Brewster in the "Bulletin of the Nuttall Ornithological Club" (Vol. VII, 1882, pp. 208, 209), from specimens

[1] Bulletin U. S. Geological and Geographical Survey, Vol. V, No. 3, p. 406.

collected by Mr. F. Stephens in the vicinity of Tucson, Arizona, in the spring of 1881. I quote him in full:

"The detection of this Flycatcher in Arizona is perhaps the most interesting discovery resulting from Mr. Stephens's late trip. *Ornithion imberbe* has only recently been added to our fauna by Mr. Sennett, and the locality of his single specimen—Lomita, Texas—was so far beyond the previously known range of the species that its occurrence seemed hardly likely to prove more than a mere accident. In 1880, however, Mr. M. A. Frazar secured additional specimens at Lomita, and now an allied but apparently distinct race turns up in Arizona.

"Mr. Stephens found the curious little bird only at Tucson, where his first specimen was taken April 28. Afterwards others were shot in the same locality, but they were by no means common. The males had a habit of perching on the tops of the tallest trees in the vicinity of their haunts, and at sunrise occasionally uttered a singular song which Mr. Stephens transcribes as 'yoop-yoop-yoopeédeedledeè,' the first half given very deliberately, the remainder rapidly. A commoner cry, used by both sexes in calling to each other, was a shrill 'pièr, pièr, pièr, pièr,' beginning in a high key and falling a note each time. They were very shy, and specimens were obtained only at the expense of much trouble and perseverence. Their loud calls were frequently heard, but when the spot was approached the bird either relapsed into silence or took a long flight to resume its calling in another direction. In their motions they resembled other small Flycatchers, but their tails were less frequently jerked.

"On May 28 Mr. Stephens met with a young bird which had but just left the nest. It was accompanied by the female parent, who showed much solicitude, and frequently uttered her shrill cries, to which the offspring responded in nearly similar tones. Both individuals were secured, but neither the nest nor the remainder of the brood—if, indeed, there were any more—could be found. On the following day this episode was repeated, a second female being found in attendance on another young bird of nearly the same age as that obtained on the previous occasion."

Mr. Stephens writes me that he took another specimen in April, 1884, also near Tucson, and considers this subspecies as very rare. Additional specimens have recently been taken by Mr. E. W. Nelson, at Etzatlan, Jalisco, on June 22, 1892, and at Tehucan, Puebla, Mexico, on May 4, 1893; these are now in the ornithological collection of the United States Department of Agriculture, but nothing appears to be known regarding the breeding habits, nest, or eggs of this subspecies.

## Family ALAUDIDÆ. Larks.

### 124. Alauda arvensis Linnæus.

SKYLARK

*Alauda arvensis* Linnæus, Systema Naturæ, ed. 10, I, 1758, 165.
(B —, C 55 bis, R 299, C 88, U [473].)

Geographical range: Europe and portions of Asia and Africa; accidental in Greenland and the Bermuda Islands. Introduced, though not successfully, in the United States, on Long Island, New York; near Cincinnati, Ohio; St. Louis, Missouri, and Portland, Oregon.[1]

The popular Skylark of Europe claims a place in our fauna, being a casual visitor in Greenland, and it also occurs occasionally in the Bermuda Islands. Several attempts have been made at various times to introduce this favorite European songster in different parts of the United States, and though some of these were apparently successful for a time, eventually, as far as known, they all failed. Up to March, 1888, the Skylark was evidently fairly well established in suitable localities on Long Island, New York, and nested there; but since the occurrence of the severe blizzard in the middle of that month none have been observed, and it is presumed that the entire colony was destroyed, the last date on which any have actually been taken there being February 22, 1888, according to Mr. William Dutcher.

Still, it seems to be a hardy bird, as Mr. Henry Seebohm states: "In western Europe it breeds up to latitude 70° (although it is comparatively rare north of the Arctic Circle)." In speaking about the general habits of this species he says: "No bird is better known or more frequently kept in confinement than the Skylark. It is easily caught, readily tamed, and bears its captivity well, singing as sweetly on the sod in its little cage as when soaring in boundless freedom high up amongst the clouds. It is found in all kinds of places, from the coast to the inland moors and mountains, but is perhaps most abundant in well-cultivated districts. It delights to frequent arable land, rich meadows, and commons, but is never seen in woods or places where trees are very close together. It is also very partial to the most elevated pastures, and often deserts a sheltered valley to remain on them throughout the year. During winter the Skylark is gregarious, but very early in the spring the large flocks break up and it retires to its breeding grounds. In March, when the cold winds are drying up the fallows, and the first spring flowers are appearing in the hedges, the Skylark pairs. At this season several males may often be seen chasing a female with great rapidity through the air, and every now and then bursting out into sweetest song. Sometimes a male will hover above the female, who crouches low among the herbage, and in various ways he will seek to display his charms.

[1] It has been reported that the colony of Skylarks set out near Portland, Oregon, some years ago, was in a flourishing condition, but on inquiry during a recent visit there, in May, 1894, I failed to have this statement confirmed.

She will then often rise into the air, when several males will toy with her and flutter round and round, or dart hither and thither with great speed, singing all the time. Sometimes the males will chase each other, and even fight for the possession of the prize.

"At this season of the year the Skylark's song is particularly loud and charming. A few birds will often be tempted to sing by an unusually mild day in winter, but the song is seldom fully resumed before March. The manner in which the Skylark sings, in the full view of all observers, is probably the secret of the bird's popularity. Who has not seen this somber little bird rise from the meadow grass or the heath, and has not watched its soaring flight as upward and upward it goes until it appears but a speck or is entirely lost in the sky? He bounds up from the cover on fluttering wings and with outstretched tail, rising a little way in silence, then, bursting into song, he pursues his upward course. At first the wings are beaten very rapidly, in a fluttering way; but when the bird gets higher the movements are more regular. Sometimes it rises directly upward, but very often goes far away from the place of its first ascent, sailing over the fields, but in an ever-rising course. When the zenith of its flight is reached it will sometimes fly about for a short time, singing; but more usually it comes down again directly. The song is continued until the ground is neared, when the bird usually drops like a stone, or flutters off over the grass ere seeking the cover. These aerial movements are not essential to the bird's song; it will sing quite as sweetly when perched on a clod of earth or on the ground, and it often warbles a few notes when running about amongst the grass or over the fallows. The height of the song flights also varies considerably. Sometimes the bird may be seen fluttering at a moderate height, singing very sweetly, and remaining in the air for some considerable time; and it will occasionally sit and sing on a small bush or a wall. When engaged in his soaring flights the little songster will cease his strains and drop to the ground if a Merlin makes its appearance, and if a Sparrow Hawk does so, he soars still higher; but a Kestrel is never regarded as an enemy.

"The Skylark has no great variety of notes—his compass is small—nor are those he possesses either powerful or rich in tone; but he pours forth his song so industriously, so continuously, and arranges his notes so harmoniously that the songs of few birds are listened to with more pleasure. The song of the Skylark is pre-eminently cheerful; and if the monotony and continuousness of the music reminds you of that of a bagpipe, it has at least no melancholy in its tone. It is not continued for so long a time as is generally supposed, ranging from two minutes to about a quarter of an hour. The call note of the Skylark can not be expressed on paper; it may best be described as a liquid, musical, double note, somewhat resembling the sound made by a whistle half full of water.

"The Skylark is not very shy, and will often allow the observer to watch it within a distance of a few yards. It runs about with great ease, often pausing for a moment to look warily around, stretching out its neck and standing as high on its legs as possible; but it often skulks very closely in the herbage. Its flight

is quick and powerful, and when passing from place to place is straight or only very slightly undulating. The Skylark is very fond of dusting itself for the purpose of getting rid of troublesome parasites; it may often be seen on a sandy road, or in a little bare patch in the fields, lying on its side, shaking its wings, and thoroughly dusting its plumage. It always roosts upon the ground, amongst tall herbage, and is seldom or never seen to perch in a tree.

"Although the Skylark often pairs early in March, nesting duties do not generally commence before the middle of April. In exceptional cases eggs may be found as early as the first week in April. The nest is always built upon the ground, amongst herbage, and is usually well concealed; generally it is placed amongst the meadow grass or the growing corn, but sometimes it is built in the coarse herbage on commons and weedy pastures, or amongst the wiry heath branches on the moors. It is often built behind a tuft of herbage, and is usually placed in a little depression, often scratched out by the bird. The nest is a simple little structure, made externally of dry, coarse grass and a scrap or two of moss, and it is lined with finer grass, rootlets, and sometimes a few hairs. These materials are very loosely put together, as is usually the case in most nests built on the ground. The eggs of the Skylark are four or five in number, sometimes only three. The ground color varies from dull white to white with just a tinge of olive, and the markings are olive brown or neutral brown, the underlying ones being pale gray. The spots are generally so thickly distributed over the entire surface as to conceal most of the ground color, and on the large end they are often confluent and form an irregular zone. On those eggs where the markings are not so thickly dispersed the zone is much broader and darker. A rare but very beautiful variety of the egg of this bird is white in ground color, thickly mottled and spotted with brownish red, and with numerous underlying markings of gray. The eggs are not subject to any great variation in color, but differ somewhat in shape, some specimens being very round, others pyriform, and many oval; they vary in length from 1 to 0.87 inch, and in breadth from 0.72 to 0.63 inch. The Skylark usually rears two broods in the year, the young of the first being generally abroad by the middle of June, and those of the second in August. The female performs most of the duties of incubation, and is a very close sitter, usually allowing herself to be almost trodden upon before quitting the nest. In returning to the nest both birds usually drop into the herbage some little distance from it, and run through the grass the remainder of the distance. During the whole period of incubation the male bird is incessantly soaring upward to warble his song, from the first streak of morning till dusk."[1]

As a rule the eggs of the Skylark are more heavily spotted and consequently darker colored than those of our Horned Larks, but they do not differ much in shape. The average measurement of eighteen specimens in the United States National Museum collection is 22.23 by 16.76 millimetres, or about 0.88

[1] History of British Birds, Vol. II, 1884, pp. 267–270.

by 0.66 inch. The largest egg in the series measures 25.65 by 17.27 millimetres, or 1.01 by 0.68 inches; the smallest, 21.08 by 16.26 millimetres, or 0.83 by 0.64 inch.

The type specimen, No. 21833 (Pl. 5, Fig. 23), Bendire collection, from a set of four eggs, was taken in Saxony, Europe, on April 20, 1859, and represents one of the darker-colored types of this species.

## 125. Otocoris alpestris (Linnæus).

HORNED LARK.

*Alauda alpestris* Linnæus, Systema Naturæ, ed. 10, I, 1758, 166.
*Otocoris alpestris* Bonaparte, Fauna Italiana Uccelli, 1839 (not paged).
(B 302, C 53, R 300, C 82, U 474.)

Geographical range: Northeastern North America, from the Province of Keewatin, Dominion of Canada, both sides of Hudson Bay, east to Labrador, and south to Newfoundland; also to Greenland and to northern Europe; south in winter to about latitude 38°, and casually somewhat farther south.[1]

The breeding range of the Horned or Shore Lark, the second largest representative of this genus found in North America, is confined, as far as known at present, to the Province of Keewatin, Dominion of Canada, both shores of Hudson Bay, and the coasts of Labrador and Newfoundland. In the latter province it has been met with during the breeding season near its southeastern extremity, at Cape St. Mary, in about latitude 47°, which probably marks about the southern limits of its breeding range. Mr. William Palmer, during the cruise of the United States Fish Commission schooner "Grampus" in the summer of 1887, met with Horned Larks at the Penguin Islands, west of Cape Freels, and at Canada Bay, Newfoundland, and says: "At the former place (a low, flat, grassy island) several old birds were seen, who during our visit perched on the bowlders that surround the island; and two young birds, which were evidently bred on the island, were collected. At Canada Bay a few old birds were found at the Cloud Hills, at an elevation of nearly 1,000 feet."[2]

Mr. L. M. Turner, in his manuscript notes on the "Birds of Labrador and Ungava," says: "The first individuals of this Lark were seen July 9, 1882, on the top of a high hill on Black Island, in Hamilton Inlet. The birds were

[1] In the general treatment of our numerous races of Horned Larks I mainly follow the classification of Mr. Jonathan Dwight, jr., who recently published an excellent synopsis of the genus *Otocoris* in the Auk (Vol. VII, 1890, pp. 138–158), to which I refer the reader, and which can not be readily improved upon until considerably more material becomes available, especially from the interior and practically unexplored regions lying to the northwest of Hudson Bay, in order to enable anyone to define the geographical ranges of each recognized subspecies more accurately. I am inclined to believe, however, that the range of the present species under consideration will have to be considerably extended to the westward, but with the material now at hand nothing very positive can be determined. Where the ranges of the different subspecies approach each other the birds intergrade and intermediate forms are found which can not be referred to a particular race with any certainty, and as the eggs of the numerous races of the genus *Otocoris* are practically similar, I have endeavored as far as possible to represent the different styles and markings found in the various subspecies among the types figured.

[2] Proceedings of the U. S. National Museum, Vol. XIII, 1890, p. 262.

evidently breeding, as indicated by their actions when they flew from point to point, but always out of range, and returning to the place whence they started. At the mouth of George's River (Ungava Bay) I procured a single bird of three which I found among the mosses of a dry, level tract near the seashore. In the vicinity of Fort Chimo these birds are common in the spring migration only, arriving just after the middle of May and remaining until the middle of September. They scatter over the treeless tracts and breed near the coast. Several specimens were procured near the mouth of the Koksoak River, and of these some had the abdomen quite denuded of feathers, proving them to be incubating in the latter ten days of June. I could not find the eggs and nest, although on several occasions I had every reason to suspect I was quite near them. I have never heard these birds make an attempt at song; the only note ever heard was a chirp, rather easily imitated, but difficult to describe."

Mr. E. A. McIlhenny has kindly furnished me with the following notes on this species:

"I found this bird breeding quite commonly on the Labrador coast at Cape Charles and vicinity, during my stay there from the 17th to the 22d of July, 1894. On the afternoon of the 17th, while in search of specimens on the high, rocky islands around Cape Charles Harbor, I saw two pairs of these birds, and, as they showed great uneasiness at my presence, I concluded they were nesting near by, but a long search failed to reveal their nests. The next morning, by sunrise, I was on the island where I had seen the first pair, and, after walking around the place where I had observed the birds the evening before without seeing anything, I fired my gun, when a short distance off to my right up got a bird, which I promptly shot, and upon going to the place it flew from I found the nest without any trouble. The bird proved to be a female Horned Lark. The nest was embedded in a slightly inclining bank of moss and entirely below the surface of the moss; it contained five richly marked eggs, slightly incubated. When I found the nest it gave me the impression of being very small for the bird; but this was due to the fact that the entrance was small, and the hollow was enlarged under the moss. The nest was deeply cupped, having a thickness of about 1 inch of fine dry grass; it was lined with the down from reindeer moss and the white feathers of Ptarmigans. The male bird did not come around.

"Later in the day I found another nest containing five heavily incubated eggs. The nest and position were very similar to the one found in the morning. Subsequently I found these birds numerous on the mainland, but no more of their nests were obtained. On September 2, while at Henly Harbor, Labrador, I found a deserted nest of this species containing three eggs. The nest was placed on a little knoll, in a marshy spot, on the bank of a small lake. On August 10, 11, and 16 I saw Horned Larks near Sukkertoppen, Greenland, but did not get a specimen; I suppose they belonged to this species."[1]

[1] No measurements of the eggs of this species taken by Mr. McIlhenny can be given, as he lost his entire collection of specimens by the foundering of the ill-fated steamer *Miranda*, while returning from Greenland.

This Horned Lark seems to be identical with the one found in northern Europe, which, according to Mr. Henry Seebohm, breeds in the extreme northeastern parts of Norway. There are no North American eggs of this species in the United States National Museum collection, and no data with the few European specimens supposed to belong to this species; judging from their size, however, they are probably correctly identified. They resemble the eggs of our better-known Horned Larks, which will be more fully described hereafter, in shape and color. There appears to be no difference in their general habits.

From three to five eggs appear to be laid to a set, and probably only a single brood is raised in a season. Their length is given by Seebohm as ranging from 0.90 to 0.95 inch, and the breadth from 0.62 to 0.70 inch, or 22.86 to 24.13 millimeters in length, and 15.75 to 17.78 millimeters in breadth.[1]

## 126. Otocoris alpestris leucolæma (Coues).

PALLID HORNED LARK.

*Eremophila alpestris* b. *leucolæma* Coues, Birds of the Northwest, 1875, 38 (part).
*Otocoris alpestris leucolæma* Stejneger, Proceedings U. S. National Museum, V, 1882, 34.
(B —, C 53*b*, R 300*a*, C 83, U 474*a*.)

Geographical range: Western North America from Alaska east to the Northwest Territory, British North America; south in winter, in the western United States, to about latitude 40°. Casually to Long Island, New York.

The breeding range of the Pallid Horned Lark, owing to the lack of sufficient material, is still very imperfectly defined. It appears to be confined to Alaska and to those portions of the Dominion of Canada east of the Rocky Mountains, from about latitude 54° northward to the Arctic Ocean, and there is little or nothing known about the eastern limits of its range.

Mr. E. W. Nelson says: "Throughout Alaska this species appears to be very rare. Two specimens were taken in the vicinity of St. Michaels during my residence there, and three were secured on the Upper Yukon by Mr. McQuesten, on April 3 and 30, 1879. All of these birds are spring males and typical of this variety. It is much more common on the head waters of the Yukon during spring and summer than along the shores of Bering Sea, where it can only be counted as a very rare straggler."[2]

In the interior of the Northwest Territory, in about latitude 68°, it appears to be a common breeding bird.

[1] Since this was written Mr. Jewell D. Sornborger has deposited three of these eggs in the U. S. National Museum collection, taken by a Moravian missionary near Okak, Labrador, on June 21, 1892. These specimens appear to come from different nests. Their ground color is greenish gray and somewhat darker than that of the rest of our Horned Larks. They are profusely blotched and spotted with dark olive, olive buff, and lighter shades of pale lavender. One of the specimens is elliptical ovate in shape; the other two are ovate. They measure 24.89 by 16.76, 24.13 by 17.27, and 22.10 by 16.26 millimetres, or 0.98 by 0.66, 0.95 by 0.68, and 0.87 by 0.64 inch. As the plates had been made up before these eggs were received, none could be figured.

[2] Report upon Natural History Collections made in Alaska in the years 1877–1881, p. 162.

In his "Notes on and List of Birds and Eggs Collected in Arctic America, 1861–1866," Mr. R. MacFarlane says, in speaking of this species: "Nine nests of this Lark were received at Fort Anderson (established on Anderson River in 1861 and abandoned in 1866; approximate latitude 68° 35′ N.), a few of them from the Esquimaux, and the others were collected by us in the Barrens and on the coast of Franklin Bay. The nest was usually composed of fine hay, neatly disposed, and lined with deer hair. Several of the parent birds were secured by snares placed thereon."

The southern limits of its breeding range are as yet very imperfectly known. Mr. Dwight records a breeding bird from the Saskatchewan region, and it probably breeds in small numbers from the northern half of this province northward. To the south it appears to intergrade for some distance with *Otocoris alpestris praticola*, which is really a miniature of the present subspecies, though somewhat darker and a trifle smaller in size, as well as with *Otocoris alpestris arenicola*, the Desert Horned Lark whose range it also adjoins along the eastern slopes of the Rocky Mountains. Its general habits resemble those of our better-known Prairie Horned Lark, which will be more fully described later.

From three to four eggs appear to be laid to a set, and probably only a single brood is raised in a season. The earliest breeding record I have, one from the lower Anderson River, in Arctic North America, is June 14; the latest, from the same locality, is July 9, 1864, and the breeding season appears to be at its height there during the first week in July, as all the nests found by Mr. MacFarlane, excepting the single one just mentioned, were taken in this month. The nest belonging to the earliest set of eggs, taken by Mr. R. MacFarlane (No. 10370, United States National Museum collection) on June 14, 1864, which is now before me, measures 5 inches in outer diameter by 2½ inches in height. The inner cup is 2½ inches in width by 1¼ inches in depth. The nest, a well-built structure, is composed of rotten grass fibers, fine roots, and pieces of willow bark, and is warmly lined with similar materials, caribou hair, and old cocoons. It was found by an Eskimo; the female was snared on the nest which contained three eggs when taken.

The eggs of the Pallid Horned Lark are mostly ovate in shape, less often elongate ovate. The shell is close grained, rather strong, and shows little or no gloss. The ground color is mostly drab gray, sometimes grayish white; in an occasional specimen a faint greenish tint is perceptible, which fades out in time. The entire surface of the egg is profusely blotched and sprinkled with different shades of pale brown. In some specimens the markings are bold and well defined; in others they are minute, giving the egg a pepper-and-salt appearance; and again they are almost confluent, causing a uniform neutral brownish appearance. In some specimens the markings are heavier and become confluent only about the larger axis of the egg, forming a wreath and leaving the ground color on the smaller end of the egg plainly visible; in fact, there appears to be an endless variation in color and markings as well as in size among these eggs and scarcely any two sets are exactly alike.

The average measurement of sixteen specimens in the United States National Museum collection, all taken by Mr. R. MacFarlane, is 23.88 by 16.76 millimetres, or 0.94 by 0.66 inch. The largest egg of this series measures 26.42 by 18.80 millimetres, or 1.04 by 0.74 inches; the smallest, 22.35 by 16 millimetres, or 0.88 by 0.63 inch.

The type specimen, No. 13941 (Pl. 5, Fig. 24), from a set of three eggs, was taken by Mr. R. MacFarlane, near Anderson River Fort, in Arctic British North America, on July 7, 1865, and represents one of the more uniformly colored types.

## 127. Otocoris alpestris praticola Henshaw.

PRAIRIE HORNED LARK.

*O[tocorys] alpestris praticola* Henshaw, Auk, I, July, 1884, 264.
(B —, C —, R —, C —, U 474*b*.)

Geographical range: Upper Mississippi Valley and the regions of the Great Lakes; north to Ontario and Manitoba; east to the New England and Atlantic Coast States; west to eastern North and South Dakota, eastern Nebraska, and Kansas; south in winter to South Carolina and westward to central Texas.[1]

As far as is at present known, the southern limits of the breeding range of the Prairie Horned Lark are confined to suitable localities in eastern Kansas, northern Missouri, Illinois, northern Indiana and Ohio, northwestern Pennsylvania, and the greater part of New York, where it reaches the seashore. It is also found more or less abundantly throughout the intervening regions northward as already indicated, including the eastern portions of the New England States (excepting possibly New Hampshire and Maine), where it is still a rather rare summer resident, and where it breeds as yet only sporadically.

Within the last thirty years the Prairie Horned Lark has extended its breeding range very materially to the eastward, and in certain localities, notably in the southwestern parts of the Adirondack region, especially in Herkimer County, New York, where this bird was practically unknown twenty years ago, it is now a fairly common summer resident, and small companies may be found in every abandoned old clearing along the numerous water courses in this otherwise heavily timbered region. It is essentially a ground bird and rarely alights on fences, trees, or bushes of any kind; its favorite resorts are fallow fields, prairie tracts, pastures, and country roads, and it is seldom found in heavily wooded country. Dry and almost barren, sandy regions, grown up in places with weeds,

[1] In discussing the geographical range of the Prairie Horned Lark Mr. Dwight states: "Strange as it may seem, it is a fact that several breeding birds from Carson, Nevada, must be considered of this race." In speaking with Mr. R. Ridgway regarding alleged specimens of *Otocoris alpestris praticola* from Carson City, Nevada, he says that, while conceding that the specimens referred to by Mr. Dwight are practically indistinguishable from Mississippi Valley specimens, he does not consider them as being referable to *Otocoris alpestris praticola* on account of their obviously different origin. He considers them as intermediate between *arenicola* and *merrilli*, a combination of whose characters would necessarily produce a bird similar to *praticola* in coloration. I fully agree with Mr. Ridgway's views in this matter, which apparently solve this problem.

etc., appear to be preferred by these birds to the more fertile sections, and in such localities they are generally common.

The Prairie Horned Lark is a hardy bird, and not a few are constant residents, even along our northern border, throughout the greater part of the year, going southward only during unusually heavy snowstorms in the latter part of December or the beginning of January, but frequently reappearing on their breeding grounds early in February, and by the latter part of the month most of these birds have already mated.

According to Prof. Walter B. Barrows, of the United States Department of Agriculture, the food of our Horned Lark consists principally of seeds of different grasses, like those of the pigeon, foxtail, and Hungarian (*Setaria*), also of those of different species of *Polygonum* (bindweed, knotweed, and smartweed), those of the ragweeds (*Ambrosia*), pigweed (*Chenopodium*), etc. Broken kernels of oats and other grains have also been found in their stomachs, evidently picked up in the roads and streets among the droppings of horses. During spring and summer, when small insects abound, a portion of their food consists of young locusts and grasshoppers, small beetles and their larvæ, and hairless caterpillars, and the young nestlings at least are fed to some extent on insect food. From an economic point of view, all our Horned Larks must be considered as useful birds, doing far more good than harm, and even if they do now and then pull up some young grain, or pick up newly sown grain or grass seed which may have been left uncovered, as it is asserted they occasionally do, such damage is at best but very trifling, and is far more than compensated for by the good they do in eating the seeds of many noxious weeds and the destruction of injurious insects, and in my opinion they deserve full protection. Their stomachs in most cases contain a large percentage of sand, which assists them greatly in the digestion of the small hard seeds on which they live to a great extent.

The late Mr. G. E. Harris kindly sent me the following notes on this subspecies, as observed by him in the vicinity of Buffalo, New York, for several seasons. He wrote: "The Prairie Horned Lark is a very common summer resident in this vicinity, and usually arrives here during the first thaw in February, coming in flocks which sometimes number hundreds. This season (1893) I first noted them on February 14; but owing to sickness my observations only covered what could be seen from my window. They appear to be unmated when they first arrive, but love making commences soon after, and by the 1st of March they are all mated; for the males are then in full song—an indescribable warble—and they may be seen chasing the females continually, like the Bobolinks, but they are not nearly as shy as the latter, as there are no hiding places at this season on the bare fields or pastures which they frequent. A nesting site is chosen as soon as the snow commences to disappear in March, and early in the season one is always selected on a little knoll or on a slight rise of ground in a pasture or meadow. The nests here are usually built on the east side of such a knoll, for protection from the cold west winds; they are mostly placed alongside a piece of

cow or horse dung, a stone, a piece of wood, or a clod of soil, and now and then in an old cow or horse track, made while the soil was soft from rain. The nest is usually very hard to locate, as both parents are very watchful. Early in the day the female will usually leave before you are within 50 yards of it, creeping away for some distance, crouched close to the ground, before taking wing, or the male will warn her by flying across the field, passing close by the nesting site, when she takes wing also and is then chased by him for some distance. Toward evening they are not so cautious, and very often the nest can be approached within a few feet, and when the female is suddenly surprised in this manner she will fly only a few yards, alight, and begin pecking the ground as unconcernedly as if her nest were not within a mile. In fact, the only anxiety I have ever seen these birds show when their nests contained eggs was by flying overhead while an intruder was close to it, but they never alight near it themselves. However, when the nest contains young they act quite differently and become greatly agitated, frequently uttering an alarm note, something like 'tseet, tseet,' hovering overhead or flying across the field, alighting occasionally for a few seconds on a fence post, only to take wing again the next minute, and uttering their alarm note constantly.

"The early nests are built very compactly and are warmly lined. First a circular hole is scratched in the ground, just deep enough so that the upper rim of the nest will be flush with the surface. The outer walls are composed of soft dead grass, and the inside is lined with thistle down and dry mullein leaves (*Verbascum*), picked into small pieces, wherever they can be obtained, the woolly nature of these leaves making a warm and comfortable lining; but where these are not to be had, and where railroads are near by, cotton waste is often substituted. An occasional feather and the blossoms of the mayweed (*Maruta*) are also used now and then. Later in the season, when the weather is warmer, less attention is paid to the lining of the nest.

"After the first brood is hatched and the young are able to leave the nest, they are always attended by the male, who keeps them together and guards them, while the female is busily engaged incubating a second clutch of eggs. The weather during the latter part of March is often very pleasant and warm, only to be followed by a heavy fall of snow about April 1, when a good many unfinished nests and incomplete sets of eggs are snowed under and deserted by the owners; in fact, only a few birds will cling to their nests under such circumstances, as I have found many abandoned ones in different seasons. During the latter part of April and through the summer season the birds seem to desert the meadows and pastures, and are then more frequently found in potato and cabbage fields, I suppose on account of the growth of the grass, as they prefer bare ground to nest on."

While social birds at all other times, during the breeding season the Prairie Horned Larks are rarely seen in flocks, each pair keeping to themselves. During the mating and breeding season the male indulges in frequent bursts of song, ascending into the air very much like the European Skylark, but its vocal

powers, although rather pleasing to the ear are apparently not equal to those of the latter. Early in the season the female also makes these aerial ascents occasionally, not to such great heights, however, as the male; but as soon as she begins housekeeping she becomes more quiet and retiring, her maternal duties taking up her entire time. On the whole, all of our Horned Larks are rather gentle and amiably disposed birds, rarely quarreling with each other excepting during the mating season, when suitors for the same female indulge in occasional bickerings, which never amount to anything serious, one or the other shortly giving way. Rivals generally begin by chasing each other on the ground until the pursued takes wing, when his opponent quickly follows and dashes against and fights him in the air until one or the other retreats. The victorious suitor then quickly returns to his coveted mate and struts before her with raised ear tufts and trailing wings, very much in the same manner as the English Sparrow. These small tufts of black feathers directly over the eyes are readily erected, and look, at a distance, like little horns, and the name of Horned Lark is due to this feature. They are generally raised when any suspicious object approaches. In winter, when the ground is covered with snow, these birds become very tame and gentle, and may often be seen feeding in small flocks in the streets and among the poultry in the barnyards, merely hopping a foot or two to one side to let one pass.

The Prairie Horned Lark is one of our earliest birds to nest, and I have been informed that nests containing eggs have been found in the vicinity of Milwaukee, Wisconsin, by February 23. An average nest of this species, now before me, taken near Fort Snelling, Minnesota, by Dr. E A. Mearns, United States Army, on June 8, 1890, measures 4 inches in outer diameter by $1\frac{3}{4}$ inches in depth, and the inner cup is $2\frac{1}{2}$ inches in width by 1 inch in depth. An occasional nest is lined with a few horsehairs or fine grass roots.

Two and occasionally three broods are raised in a season, and incubation, which lasts about fourteen days, is, I believe, about equally shared by both sexes; the young are also cared for by both parents; they grow rapidly and leave the nest before they are able to fly well. The male usually takes care of them, pointing out suitable food, but does not feed them; they have to pick it up, and soon learn to provide for themselves. They utter a faint "peep-peep" while feeding, and before they can fly well they hide among the grass and weeds at the alarm note of their parents. Many nests and young are yearly destroyed by cattle stepping on them, and by prowling cats and vermin, and, although this subspecies is very prolific, it is doubtful if more than a single brood from each pair reaches maturity.

From three to five eggs are laid to a set, usually three or four, sets of five being rarely found. These eggs resemble those of the preceding subspecies in shape and color, but are somewhat smaller and usually slightly lighter colored. In a set of four eggs taken by Mr. Henry Fisher, near Maywood, Illinois, on May 24, 1879, the ground color is suffused with a pale lavender tint, and one of the eggs shows a rather large, irregular blotch of pale purple on the side.

The average measurement of sixty specimens in the United States National Museum collection is 21.65 by 15.78 millimetres, or about 0.85 by 0.62 inch. The largest egg of the series measures 24.13 by 16 millimetres, or 0.95 by 0.63 inch; the smallest, 18.29 by 14.99 millimetres, or 0.72 by 0.59 inch.

The type specimen, No. 24731 (Pl. 5, Fig. 25), from a set of three eggs, Ralph collection, was taken by the late Mr. George E. Harris, near Buffalo, New York, on March 19, 1890, and represents one of the lighter-colored and finer-marked examples found among the eggs of this subspecies.

### 128. Otocoris alpestris arenicola Henshaw.

DESERT HORNED LARK.

*O[tocorys] alpestris arenicola* Henshaw, Auk, I, July, 1884, 265.
(B —, C —, R —, C —, U 474*c*).

Geographical range: Regions of the Great Plains, the Rocky Mountains, and the Great Basin; north, as far as positively known, to about the northern boundary of the United States, and certainly also into the southern parts of the Provinces of Alberta and western Assiniboia, in the Dominion of Canada; east to western North and South Dakota, the western half of Nebraska, Kansas, the Indian and Oklahoma Territories, and northwestern Texas; west throughout the more arid portions of Idaho, Nevada, and southeastern California, east of the Sierra Nevadas, as well as through the intervening regions; south in winter through northern Arizona and New Mexico to southern Texas and eastern Mexico.

The breeding range of the Desert Horned Lark is both an extended as well as a variable one, breeding as it does on the higher Rocky Mountain plateaus of Montana, Colorado, northern New Mexico, and Arizona up to altitudes of about 10,000 feet, as well as in the hot desert valleys of southern Nevada and southeastern California, where it appears about equally common. The northern limits of its breeding range unquestionably extend well beyond our border into the Provinces of Alberta and Assiniboia. In the former province I saw Horned Larks on the outskirts of Calgary, feeding close to the Canadian Pacific Railroad tracks, in the latter part of May, 1894, which are in all probability referable to this subspecies, as the surrounding country is quite similar to that found in the vicinity of Fort Custer, Montana, where it breeds abundantly. Dr. James C. Merrill, United States Army, also found it breeding quite commonly in the vicinity of Fort Shaw, Montana, and states: "The nests are placed anywhere in the open prairie, and are little more than slight depressions in the ground, lined with a few dry blades of grass. Often there is not the slightest shelter or concealment; at other times the nest is partly hidden by a tuft of grass, a stone, or a buffalo bone; the eggs are usually three in number."

Its general habits, food, etc., are very similar to those of the Prairie Horned Lark. I have met with it as a summer resident in various parts of the West, at Fort Custer, Montana, and in many places throughout southern Idaho, Nevada, and southeastern California, where it frequents the plains or rolling country, covered with short buffalo grass or a stunted growth of sagebrush, avoiding the more luxuriant growth of the moister river valleys. I have seen scores of these

birds miles away from water, and they may frequently be observed running along the roads in search of food and engaged in taking dust baths. Many are yearly destroyed by the terrific hailstorms so prevalent along the eastern slopes of the Rocky Mountains, while others are often benumbed and smothered on the open prairies, where there is little or no shelter from sudden blizzards and fierce snowstorms; taking it all in all, they seem to have a hard fight for life, and it is a wonder that so many survive.

Mr. William G. Smith writes: "While I lived in the Platte River Canyon, 40 miles west of Denver, Colorado, a terrible snowstorm set in suddenly in April, and with it came thousands of these birds, which tried to shelter themselves under projecting banks. The majority were soon so chilled by the intensely cold wind which was blowing at the same time, that they could not move, and were quickly smothered by the drifting snow; and after this melted bushels of their dead bodies could be picked up everywhere. My children brought a great many live birds into the house. They seemed completely bewildered and made no attempt to escape capture, but seemed very thankful for their freedom next morning."

Many of these birds winter within the United States along our southern border, in the Colorado Desert and similar localities, while a few may be found in midwinter occasionally as far north as latitude 39°. Of fourteen specimens sent me in the flesh by Mr. William G. Smith, of Loveland, Colorado, shot on January 15, 1892, twelve were intermediate between *Otocoris alpestris leucolæma* and *Otocoris alpestris arenicola*, and but two were typical examples of this subspecies, probably all being migrants from the north.

The breeding season of the Desert Horned Lark commences apparently much later than that of the Prairie Horned Lark in similar latitudes, and even much farther south. The earliest breeding record I find among the series of eggs of this subspecies in the United States National Museum collection is one of my own, a set of three eggs taken near Fort Custer, Montana, on May 16, 1885, in which incubation was well advanced; the latest is from the Black Hills, in South Dakota, July 21, 1859. The majority of the records fall in June, and two are in July. Mr. Robert Ridgway found a nest of this subspecies, with four eggs, near Truckee, Nevada, on June 3, 1868. Probably two broods are raised in a season. From three to four eggs are laid to a set. They resemble those of the previously described subspecies very closely, both in shape and coloration, excepting that an occasional set is rather more evenly and lighter colored, giving the egg a uniform pale gray appearance.

The average measurement of forty-five specimens in the United States National Museum collection is 21.84 by 15.85 millimetres, or about 0.86 by 0.62 inch. The largest egg of the series measures 23.37 by 17.02 millimetres, or 0.92 by 0.67 inch; the smallest, 19.56 by 15.24 millimetres, or 0.77 by 0.60 inch.

The type specimen, No. 21971 (Pl. 5, Fig. 26), from a set of three eggs, was taken by Dr. James C. Merrill, United States Army, near Fort Custer, Montana, in June, 1881, and represents one of the pale gray types previously mentioned.

## 129. Otocoris alpestris giraudi Henshaw.

TEXAN HORNED LARK.

*Otocorys alpestris giraudi* Henshaw, Auk, I, July, 1884, 266.
(B —, C —, R —, C —, U 474*d*.)

Geographical range: Coast regions of southern Texas.

The breeding range of the Texan Horned Lark is coextensive with its geographical distribution in the United States. It seems to be found along the entire coast line of Texas, breeding from Galveston to Point Isabel, near the mouth of the Rio Grande. Its range does not appear to extend very far inland, and it is probably a resident throughout the year; still this is not certain, as there are, so far as I am aware, no winter specimens taken in the United States in any of our larger ornithological collections.

Mr. W. E. Grover, of Galveston, writes: "The Texan Horned Lark is locally known here as 'Chippie' and 'Road Chippie,' as it is essentially a ground bird. It frequents the level, grassy prairies along the Gulf shore, and may frequently be observed in the wagon roads; hence its local name. I do not know how early it arrives in this vicinity; I noticed a few on April 1, and by May they are abundant. The nest is built in a saucer-shaped hole scratched out by the birds, and here it is nearly always placed alongside of bunches of wild chamomile (*Matricaria coronata*) growing close to the road; it is constructed of dry prairie grass and lined with thistle down. The top of the nest is even with the surrounding ground."

All the nests of the Texan Horned Lark I have seen are much more substantially built than any of the balance of the subspecies breeding within the United States. The United States National Museum is indebted to Mr. H. P. Attwater for several of their nests and eggs—in fact, for all that are in the collection at present. One of these nests, containing three eggs, on the point of hatching when found on April 23, 1892, is an unusually bulky one. It was placed in a pile of dry cow droppings near the shore of Aransas Bay. The outer walls are chiefly constructed of salt-cedar twigs (*Monanthochloe littoralis*), and the lining consists of dry sea moss picked up on the shore. It measures 6 inches in outer diameter by 2½ inches in height. The inner cup is 3 inches in width by 2 inches in depth. An average nest from the same locality, taken May 23, 1892, containing four eggs in which incubation had commenced, measures about 4 inches in outer diameter by 1¾ in height; the inner cup is about 2¼ inches in width by 1½ inches in depth. Externally it is also composed of small twigs of salt cedar and coarse dry grass, and it is sparingly lined with blades of dry grass, and a few feathers.

Mr. Attwater writes me under date of March 20, 1893: "Quite a number of Texan Horned Larks here, are still in small flocks; a few, however, seem already to be mated, but I have thus far been unable to locate any of their nests."

All the eggs in the United States National Museum collection excepting a single set were taken in the third week in May, evidently second broods, and a nest, with three young birds about a couple of days old, was found on April 19, 1892, indicating that the breeding season commences probably about the latter part of March and lasts through April and May. The usual number of eggs laid to a set appears to be three or four, and these resemble very closely those of the other subspecies already described, both in shape and coloration. Two specimens show a couple of dark-colored hair lines about their larger ends, resembling those found on our Orioles.

The average measurement of fourteen specimens in the United States National Museum collection is 21.90 by 15.54 millimetres, or about 0.86 by 0.61 inch. The largest egg measures 23.62 by 16 millimetres, or 0.93 by 0.63 inch; the smallest, 20.83 by 14.99 millimetres, or 0.82 by 0.59 inch.

The type specimen, No. 25159 (Pl. 5, Fig. 27), from a set of four eggs, was taken and donated to the collection by Mr. H. P. Attwater, near Rockport, Aransas County, Texas, on May 19, 1892, and represents one of the lighter styles of coloration found among these eggs.

## 130. Otocoris alpestris chrysolæma (Wagler).

MEXICAN HORNED LARK.

*Alauda chrysolæma* Wagler, Isis, 1831, 530.
*Otocoris alpestris chrysolæma* Stejneger, Proceedings U. S. National Museum, V, 1882, 34. (B —, C 53*a*, R 300*b*, C 84, U 474*e*.)

Geographical range: Table-lands of Mexico, from Vera Cruz northward, including the higher plateau regions of northern Lower California, as well as the coast districts west of the Coast Range in California, north to about latitude 39°.

The breeding range of the Mexican Horned Lark, while quite an extensive one, is still very imperfectly defined, there being but little material on hand from Mexico, and this only from about the extreme southern limits of its range where it is known to breed. Nothing is known regarding its distribution throughout central Mexico, while in Lower California it appears to be confined, during the breeding season at least, to the more northern parts of the peninsula.[1]

Mr. A. W. Anthony writes me: "*Otocoris alpestris chrysolæma* nests on the San Pedro Martir Mountains at altitudes of about 8,500 feet, while on both the eastern and western slopes it is replaced during the breeding season by *Otocoris alpestris pallida*, a strikingly different race." It is also reported as breeding at San Quentin, near the coast. It is not uncommon throughout the coast districts of southern California, and apparently reaches the northern limits of its range here in Sonoma County, about latitude 39°.

[1] Since this was written the U. S. Department of Agriculture has obtained quite an extensive series of skins from the States of Puebla, Mexico, Hidalgo, Tlaxcala, and Chihuahua, Mexico, taken at different seasons, which seem to be all referable to this race, and indicate that the Mexican Horned Lark is pretty generally distributed in suitable localities throughout the greater part of the Mexican Republic.

Its general habits, food, etc., are very similar to the other subspecies of this genus. Mr. F. Stephens writes me: "The Mexican Horned Lark breeds in most of the larger valleys (if not too wet) throughout southern California, from sea level to the pines. Near Riverside they nest in the orchards and vineyards, but in other localities the nesting site is usually away from the brush. A nest containing two eggs was found by me in a salt marsh at False Bay, near San Diego, California, which was situated similarly to those of *Ammodramus beldingi*."

Mr. Rollo H. Beck writes that this subspecies is a common resident in Santa Clara County, where it breeds in considerable numbers, both in fields adjoining sloughs that connect with San Francisco Bay and in the hills on the eastern side of the valley. Mr. Charles A. Allen reports it as common in Marin County, and several males shot by him near Nicasio on April 29, 1890, sent me for examination, are referable to this subspecies. Nearly all of the eggs of this subspecies in the United States National Museum collection were taken in the vicinity of Santa Cruz, California. A set from the extreme southern limits of its range, taken by Mr. E. W. Nelson near Perote, Vera Cruz, Mexico, is probably referable to this subspecies. This nest, found on June 6, 1893, contained only two eggs, in which incubation had commenced; these are somewhat larger than eggs from southern California. The nesting habits of the Mexican Horned Lark are quite similar to those of the other subspecies of this genus. Occasionally a nest is found in a perfectly open situation; at other times it is somewhat sheltered by a bunch of grass or weeds: and again it may be placed in cultivated fields, etc. Mr. G. H. Atkinson took a nest containing four fresh eggs near Santa Clara, California, on May 18, 1894, placed beside a row of carrots, and composed entirely of dried grasses; and on June 14 another nest, containing three fresh eggs, was found in a similar situation, probably built by the same pair of birds. Nidification usually begins about the middle of April, and probably two broods are regularly raised in a season, as fresh eggs are frequently found in June. From two to four are laid in a set, generally three. These resemble those of the previously described subspecies in coloration and shape.

The average measurement of twenty eggs in the United States National Museum collection is 20.69 by 15.37 millimetres, or about 0.82 by 0.60 inch. The largest egg of the series (one of the set from Perote, Vera Cruz, Mexico) measures 23.11 by 15.24 millimetres, or 0.91 by 0.60 inch; the smallest, 19.05 by 15.24 millimetres, or 0.75 by 0.60 inch.

The type specimen, No. 21028 (Pl. 5, Fig. 28), from a set of three eggs, Merrill collection, was taken near Santa Cruz, California, in April, 1879, and has been selected as showing the ground color rather clearly.

## 131. Otocoris alpestris rubea Henshaw.

RUDDY HORNED LARK.

*O[tocorys] alpestris rubeus* Henshaw, Auk, I, July, 1884, 267.
(B —, C —, R —, C —, U 474*f*.)

Geographical range: Valleys of the interior of California, mainly those bordering the Sacramento River, north to about latitude 40°, between the coast ranges and the Sierra Nevada; south into the San Joaquin Valley in winter.

The breeding range of the Ruddy Horned Lark is confined, as far as known, to a comparatively small area of the interior of the northern half of California, the valleys of the Sacramento River and its larger tributaries, and possibly also to the northern parts of the San Joaquin Valley, but this is not yet positively known. It is generally a resident where found, excepting in unusually severe winters, when it migrates to more congenial localities in the southern part of the State.

Mr. Charles H. Townsend, in speaking of this subspecies, says: "This form of the Horned Lark is a very common inhabitant of the plains and open country everywhere in northern California. It was found in limited numbers on the sage-covered districts north of Mount Shasta in midsummer. The closely-grazed sheep pastures of the Upper Sacramento Valley were alive with them in April and May, and they were abundant in July on the grassy plains east of Mount Lassen. As I was not at Red Bluff in midsummer or midwinter, I can not affirm that they are always present there, but think it not unlikely; a few were nesting there late in May. On May 4 I found a most remarkable nest of eggs, in all probability of this species. I had secured a number of Horned Larks the same morning in a stubble field, and a nest containing one egg of the usual olive-white color, with minute dark spots, so characteristic of the egg of the species, when a plowman approached with a nest containing three eggs of similar size and pattern of marking, but so suffused with a rich reddish brown as to be unrecognizable. The man said they were those of a bird exactly like the *Otocoris* in my basket. Both nests were of equal size, loosely made of grasses and weeds, and placed among the clods and stubble. There were no other birds on the entire plain but Horned Larks, and as the eggs agree with no others, there is no alternative but to call them eggs of this species."[1]

The general habits, food, etc., resemble those of the other members of this family very closely, as well as the eggs, of which there are few in the United States National Museum collection—only those taken by Mr. Townsend, mentioned already. The three reddish-colored eggs are unquestionably referable to this subspecies, and such instances of abnormal coloration are known to occur occasionally in other species as well. Two parallel cases will be found among those described of the California Jay and the Crow, in which the normal green color and darker markings are replaced by ruddy and pinkish buff tints.

[1] Proceedings of the U. S. National Museum, Vol. 10, 1887, p. 210.

The measurements of the four eggs of this subspecies in the United States National Museum collection are as follows: The single normally colored egg, No. 21703, taken on May 4, 1884, measures 19.81 by 15.24 millimetres, or 0.78 by 0.60 inch; No. 21704, a set of three eggs taken on the same date and at the same place, the reddish-colored specimens, measure, respectively, 20.83 by 14.73, 18.54 by 14.48, and 19.56 by 14.48 millimetres, or 0.82 by 0.58, 0.73 by 0.57, and 0.77 by 0.57 inch.

The type specimen, No. 21704 (Pl. 5, Fig. 29), the largest egg of the set just mentioned, was obtained by Mr. Charles H. Townsend near Red Bluff, California, on May 4, 1884, and represents an abnormally colored specimen of this subspecies.

## 132. Otocoris alpestris strigata Henshaw.

STREAKED HORNED LARK.

*O[tocoris] alpestris strigata* Henshaw, Auk, I, July, 1884, 267.
(B —, C —, R —, C —, U 474*g*.)

Geographical range: Coast regions of Oregon, Washington, and southern British Columbia, west of the Cascade Mountains; south in winter to southern California.

The breeding range of the Streaked Horned Lark, as far as known, is confined to the coast districts of Oregon, Washington, and southern British Columbia, including the areas of heavy rainfall, and it probably also breeds in similar localities in northern California. In these generally heavily timbered regions it inhabits the few dry prairies and more open valleys found near the coast. Mr. H. P. Lawrence met with a single specimen near Ridgefield, Clarke County, Washington, where it appeared to be rare, on July 13, 1892. During a recent visit to Puget Sound, in May, 1894, I found it moderately common on the dry, gravelly plains between Tacoma and Steilacoom, in Pierce County. While some were still in small flocks, many were apparently already mated, and some, judging from their actions, had nests close by; but on account of the limited time at my disposal I did not succeed in finding any. Mr. John Fannin, curator of the Provincial Museum, Victoria, British Columbia, records specimens taken at Burrard Inlet, Chilliwhack, and other localities west of the Cascades, in this province. Mr. A. W. Anthony met with this race at Beaverton, Oregon, where it breeds. A deserted nest containing three eggs was found by him on May 21, 1884, placed in an old cow track, consisting merely of a few grass stems and lined with a little cattle hair. These eggs measure 20.83 by 15.24, 20.57 by 15.24, and 20.07 by 14.99 millimetres, or 0.82 by 0.60, 0.81 by 0.60, and 0.79 by 0.59 inch, and are undoubtedly referable to this subspecies. On May 25 a female was shot with an egg in the oviduct ready to deposit. The ground color of the set previously mentioned shows the pale-greenish tint occasionally found in the eggs of this genus, and one of them has a few reddish-brown

hair lines scattered over its center. Not being absolutely identified, I have not figured one of them. Specimens taken in winter at Salem, Oregon, by Dr. Clinton T. Cooke, have been identified as this subspecies; the majority; however, move farther south, spending the colder part of the year in southern California.

## 133. Otocoris alpestris adusta Dwight.

SCORCHED HORNED LARK.

*Otocoris alpestris adusta* Dwight, Auk, VII, April, 1890, 148.
(B —, C —, R —, C —, U 474*h*.)

Geographical range: Southern Arizona and New Mexico, western Texas, and southward into northern Mexico.

The breeding range of the Scorched Horned Lark is confined to the southern borders of the United States through southern Arizona, the greater part of New Mexico and western Texas, south into northern Mexico. This race inhabits the more arid valleys and table-lands so common in the regions mentioned, and in suitable localities it is resident throughout the year. In New Mexico it has been found breeding as far north as Santa Fe, which probably marks the northern limits of its range. The Scorched Horned Lark is a common breeder in the vicinity of Forts Huachuca and Bowie, in southern Arizona, where Mr. Frederick Hall Fowler found a number of their nests and eggs; and the United States National Museum is indebted to him for all the sets of this subspecies in the collection.

Its general habits, nests, etc., are similar to those of the other members of this genus. The nests, according to Mr. Fowler, are sunk flush with the surface of the ground, and are usually placed beside a tussock of grass or a piece of dry cow dung in the open plain, and more rarely under a bush, as these are more or less frequented in midday by snakes and egg-eating lizards. The number of eggs laid to a set varies from two to four, sets of three being most common. The eggs resemble those of our other Horned Larks in color and markings, but are mostly short ovate in shape. The nesting season appears to be at its height in April, and probably several broods are raised in a season.

The average measurement of fifteen eggs in the United States National Museum collection is 21.27 by 16.08 millimetres, or about 0.84 by 0.63 inch The largest egg in the series measures 23.88 by 16.26 millimetres, or 0.94 by 0.64 inch; the smallest, 19.56 by 16 millimetres, or 0.77 by 0.63 inch.

The type specimen, No. 25242 (Pl. 5, Fig. 31), from a set of three eggs, was taken by Mr. Frederick Hall Fowler, near Fort Huachuca, Arizona, on May 5, 1892, and represents one of the larger eggs of this subspecies.

## 134. Otocoris alpestris merrilli Dwight.

DUSKY HORNED LARK.

*Otocoris alpestris merrilli* Dwight, Auk, VII, April, 1890, 153.
(B —, C —, R —, C —, U 474*i*.)

Geographical range: From southern British Columbia south through Washington and Oregon east of the Cascade Mountains, and northern California, east of the Sierra Nevada, east to southwestern Alberta? and Idaho; south in winter to Nevada and California.

The breeding range of the Dusky Horned Lark, as far as known, extends from the eastern slopes of Mount Shasta, in northern California, through those parts of Oregon, Washington, and southern British Columbia east of the Cascade Mountains, north to about latitude 51°; eastward it ranges through the more fertile portions of Idaho, and quite likely also into the southwestern parts of the Province of Alberta, in the Dominion of Canada.

This subspecies is essentially a bird of the foothills (the so-called "bunch grass country," *Festuca* sp.?) as well as of the more open and grass-covered valleys and plains occasionally found in the mountains, while it is either rare or entirely absent in the more arid sagebrush plains found interspersed through the same regions. I have met with the Dusky Horned Lark in various parts of Oregon and Washington, where it is quite common in suitable localities. While en route from Fort Walla Walla, Washington, to Fort Klamath, Oregon, during the latter part of May and the first two weeks in June, 1882, some of these birds were almost constantly in sight wherever the road passed through open country, and many young birds had already left their nests. At Fort Klamath they were not uncommon on the gravelly prairie adjoining the Post, and Dr. James C. Merrill, United States Army, found it breeding there. In the vicinity of Camp Harney, Oregon, it was very rare in summer and only seen on the more open, grass-covered plains in the central parts of the Harney Valley, the higher portions of this being covered with a good growth of sagebrush (*Artemisia*), which they seem to avoid.

Its general habits, etc., as well as its nests and eggs, are similar to those of the other members of this genus. Undoubtedly two broods are raised in a season, as I found a set of two slightly incubated eggs in the Great Bend of the Columbia River on June 9, 1879. The nest was placed in a slight depression beside a tussock of bunch grass near the trail from Lake Chelan to Spokane Falls, Washington, and I found these birds as common here as farther south. The eggs resemble those of the other members of this family, and from two to four are usually laid to a set.

The average measurement of five specimens in the United States National Museum collection is 20.95 by 15.92 millimetres, or about 0.82 by 0.63 inch. The largest egg measures 21.84 by 16.51 millimetres, or 0.86 by 0.65 inch; the smallest, 20.32 by 15.24 millimetres, or 0.80 by 0.60 inch.

The type specimen, No. 20387 (Pl. 5, Fig. 30), Bendire collection, from a set of two eggs, was taken by the writer, and represents a rather uniform and evenly marked egg.

## 135. Otocoris alpestris pallida Townsend.

SONORAN HORNED LARK.

*Otocoris alpestris pallida* Townsend, Proceedings U. S. National Museum, XIII, 1890, 138. (B —, C —, R —, C —, U 474*j*.)

Geographical range: Lower California and western Sonora, Mexico.

The breeding range of the Sonoran Horned Lark is probably coextensive with its geographical distribution, but comparatively little is yet known about this small pallid race.

Mr. A. W. Anthony writes me: "While *Otocoris alpestris chrysolæma* nests on the San Pedro Martir Mountains at altitudes of about 8,500 feet, the nesting form on both the lower eastern and western slopes of these mountains is Townsend's *Otocoris alpestris pallida*, a strikingly different race." In a more recent letter (July 8, 1894) he writes: "Pallid Horned Larks are common and breed somewhere not far from my camp, south of San Quentin, Lower California, where they came to the corral each day in small companies of from two to six, and over forty were shot; but their number continued about the same; they dropped down from high overhead. Skins taken in December show strong traces of intergradation with *Otocoris alpestris chrysolæma*." I believe the eggs of this subspecies still remain unknown, but they are not likely to differ materially from those of our better-known Horned Larks, and its habits are undoubtedly also similar.

## 136. Otocoris alpestris insularis Townsend.

INSULAR HORNED LARK.

*Otocoris alpestris insularis* Townsend, Proceedings U. S. National Museum, 13, 1890, 140. (B —, C —, R —, C —, U —.)

Geographical range: Islands off the coast of southern California, including Santa Cruz, Santa Rosa, San Nicolas, and San Clemente.

This insular race of Horned Lark has not yet been admitted to subspecific rank by the American Ornithologists' Union, but as I believe that it is well entitled to such recognition, I enumerate it among the other numerous recognized races of this genus. Mr. Dwight, in his paper on the "Horned Larks," says, on page 152: "Mr. C. H. Townsend has kindly loaned me a series of ten male Horned Larks from the Santa Cruz group of islands, California, including the type of the race he calls '*insularis*.' I am much surprised to find his birds practically indistinguishable from Oregon specimens of *strigata*. They

are the same size, and, though averaging a little darker, the nape approaching brick red, some of them can be matched by the few specimens of *strigata* I have for comparison."

While it is quite true that this island race resembles the Streaked Horned Larks from the northwest coast very closely, still the streaks on the back of the latter, particularly on the lower back, are much darker and more sharply defined, with lighter interspaces, and the wing is also shorter. The under parts, at least on the breast, are pale buffy yellow in *strigata*, while in *insularis* they are always white, without any yellow tinge. Climatic differences must also be considered, and the greatest possible variation exists in the respective habitats of these two races. While the Streaked Horned Lark inhabits regions of excessive rainfall, the climate on the islands is exactly the reverse, being excessively dry and desert-like, and, furthermore, this insular race is a resident and breeds on these islands, and the breeding ranges of the two do not approach each other by several hundred miles; for these reasons I do not consider them to be referable to *strigata*, and they certainly can not be included among *chrysolæma*, to which Mr. H. W. Henshaw originally referred them. He found them very common residents on Santa Cruz Island and breeding there. He says: "The nests were but rude attempts, being nothing more than a small pile of dried grasses sufficiently hollowed to admit of the reception of the eggs. One (No. 17295, containing three eggs, taken on June 4, 1875, on Santa Cruz Island, California) is deserving of notice as being placed within the cavity of an abalone shell, one of a large heap lying half overgrown with herbage. The whole cavity of the shell was filled by the material, and the eggs looked very pretty as they lay contrasted with the shiny, pearly shells clustered about them."

Mr. Henshaw, in speaking of the social habits of the Horned Lark, says: "The immense flocks of these birds that gather together in the fall are well known, but I was surprised to find to what extent this sociable feeling was carried during the breeding season. Both on the mainland and on the island they were seen all through June in scattered flocks of both sexes, though nearly all, perhaps all, were at this time nesting. Both sexes incubate, and it appeared to be the habit of the birds, when off duty, to repair together in small flocks, and thus to wander in search of food. At this season they do not resort much to the sandy beaches, but keep on the upland, where among the herbage they find more easily and in greater abundance the insects and seeds which they are fond of."[1]

Dr. E. A. Mearns, United States Army, found this subspecies breeding on San Clemente, the southernmost island off the coast of California, and sent some fragments of eggs found on August 28, 1894, to the United States National Museum collection. It has not yet been recorded from Santa Catalina Island, but as I have received Horned Larks' eggs from this island, they probably are also referable to this race.

[1] U. S. Geological Surveys West of the 100th Meridian, Appendix JJ, Wheeler, 1876, p. 248.

Two sets, each containing three eggs, now in the United States National Museum collection, taken by Mr. Henshaw on June 3 and 5, 1875, on Santa Cruz Island, California, measure, respectively, 22.10 by 15.49, 21.59 by 15.24, and 21.59 by 15.24 millimetres, or 0.87 by 0.61, 0.85 by 0.60, and 0.85 by 0.60 inch. The other set measures 20.32 by 15.49, 20.07 by 15.49, and 19.05 by 15.24 millimetres; or 0.80 by 0.61, 0.79 by 0.61, and 0.75 by 0.60 inch. They resemble the eggs of the other subspecies of this genus, and no specimen has been figured.

## Family CORVIDÆ. Crows, Jays, Magpies, etc.

### 137. Pica pica hudsonica (Sabine).

AMERICAN MAGPIE.

*Corvus hudsonicus* Sabine, Appendix Franklin's Journey, 1823, 25, 671.
*Pica pica hudsonica* Jordan, Manual of Vertebrates, ed. 4, 1884, 94.
(B 432, C 233, R 286, C 347, U 475.)

Geographical range: Middle and western North America; from Alaska and the Alaskan Peninsula south through British Columbia, Washington, Oregon, northeastern California, northern and middle Nevada, northern Arizona, and northern New Mexico; east to eastern Colorado, western Nebraska, western South and North Dakota, and western Manitoba, as well as the intervening regions, as Utah, Wyoming, Montana, and Idaho; casually straggling in winter to western Kansas, eastern Nebraska, northwestern Iowa, Minnesota, Wisconsin, and Michigan, and the Province of Ontario, Dominion of Canada.

The American or Black-billed Magpie is one of the best known and most characteristic birds of our western avifauna. It is generally a resident and breeds wherever found, excepting perhaps in the extreme northern portions of its range in Alaska and along the eastern border (the regions of the Great Plains), where it occasionally wanders eastward in the late fall and winter, probably driven away from its usual haunts by scarcity of food or severe storms, which so frequently occur in these sections of country.

The American Magpie is a handsome and striking-looking bird, certain to be noticed by anyone, even if not ornithologically inclined. It is extremely pert in its general bearing and movements, both on the ground and in the trees, and the strongly contrasting colors of its plumage are sure to draw attention to it at once. On the wing, however, it shows to less advantage; its flight is slow and wavering, and in windy weather evidently laborious. The long, wedge-shaped tail seems then to be decidedly in the way and a positive disadvantage, causing it no little trouble in flying from point to point, and in such weather it will only leave through necessity the sheltered bottom lands it usually frequents.

Although more or less quarrelsome, it is social in disposition and likes to be in the company of its kind. I have frequently seen from twelve to thirty feeding together near a slaughterhouse or some other locality where food was abundant; but such gatherings are oftener met with in the late fall and winter

than during the season of reproduction. They are jolly, noisy scamps, nearly always chattering or scolding, even when alone. When not molested they soon lose their usual shyness, and will allow one frequently to approach them within a few feet; but notwithstanding this seeming confidence they are constantly on their guard against danger, and I know no bird more intelligent, and at the same time more saucy, impudent, and cunning than our Magpie. They appear to comprehend the difference between a shotgun and a stick from the day they are able to fly.

I have had many opportunities to observe these birds closely, and was long ago forced to the conclusion that their intelligence and reasoning powers are astonishing. I will only mention one instance of their sagacity, showing how several of these birds seemingly worked in perfect accord to accomplish an object which one bird could not have carried out alone. While stationed at Fort Lapwai, Idaho, on the Nez Perce Indian Reservation, from 1869 to 1871, where Magpies were exceedingly abundant, I possessed a fine setter dog, my constant companion on all excursions, who assisted me in finding many rare nests, and whom I regularly fed, giving him, when the more liquid portion of his meal was finished, a well-boiled soup bone, with more or less meat attached, by way of dessert. I made him carry this to the lawn in front of my quarters, while I sat on the porch watching him. I soon noticed that generally a minute or so after the dog appeared with his bone from four to six Magpies would invariably be close by, though not a single one was in sight before. These birds placed themselves in different positions around the dog, plainly showing a preconcerted arrangement, and were ready for business at once. One stationed itself directly in front of the dog's nose and about 2 feet away, another behind, within easy reach of the tail, and one or two by his side. As soon as the dog became engaged in gnawing his bone, held in place by his forepaws, the bird stationed in the rear made a vicious dash at his tail and pecked it severely; this naturally enraged "Rock," who quickly wheeled around, left the bone, and tried to catch the offender, who in the meantime flew slowly and leisurely away, toling the dog after him as far as possible by fluttering almost within his reach, and while this little ruse was being enacted the remaining birds promptly helped themselves. I saw this performance several times, and soon noticed that the different birds forming this foraging party could be readily distinguished by the variation in size, the length of the tail, or some injury to the tail or wing feathers, etc., and this led to a still more remarkable discovery in this connection. After the dog returned to resume his interrupted meal, another bird took position at the dog's tail, while the one occupying it previously moved to the best place, that in front of the dog's head, to enable it to get its share of the spoils. I observed this maneuver several times, and it did not take the dog very long to see through it as well, so that unless I forced him to stay on the lawn he would at once carry his bone under the porch, where the birds did not dare to follow him. If this incident does not show an extraordinary amount of intelligence and reasoning power, I do not know what would.

There seemed to be a perfect understanding from the start about the mode of attack by which they accomplished their purpose, which could not have been successfully done in any other way.

That they are most skillful thieves is well known to any one acquainted with these birds. How to carry off an egg larger than it could grasp in its bill might puzzle a bird of another species, but not the Magpie. If too large to carry in the ordinary way, it simply runs its beak through the shell and carries it off in this manner. If one manages to find the entrance to a henhouse, eggs will always be scarce thereafter. Aside from its thieving propensities it is also one of the most mischievous birds I know, and enjoys scaring and deceiving better-behaved members of the feathered tribe. It will mimic the cry of a Hawk as well as that of the Jay, and seems to delight in causing the poultry to run in every direction; it also imitates the cackle of a hen just after she has deposited an egg, causing the roosters to search for her; in fact, it delights in playing tricks of all kinds, and seems to enjoy them thoroughly. An enumeration of the various misdeeds and laughable performances of a pet Magpie belonging to one of the cavalry troops I served with would fill a fair-sized book, but it would be out of place here. Some of these birds are far more intelligent than others. Any bright, glittering object is sure to draw their attention, and is promptly picked up and secreted, it matters not how large it may be, if it is not too heavy to carry or drag away.

The southern and eastern range of the American Magpie has become somewhat restricted within recent years, and they are no longer found in certain localities where thirty years ago they were reported as fairly common. It prefers rather open country, shuns the heavy forests and strictly desert regions, and in the Rocky Mountains has been observed at high altitudes. The shrubbery and undergrowth found along water courses and springs in the foothill regions and the canyons in the higher mountains seem to be its favorite habitat.

Its ordinary call note is a querulous "cäck, cäck," or "chäeck, chäeck," uttered in a high key, and is disagreeable to the ear, but it frequently utters also a low, garrulous gabble, intermixed with whistling notes, not at all unpleasing, as if talking to itself, and if annoyed at anything it does not hesitate to show its displeasure by scolding in the most unmistakable manner. The Magpie spends considerable time on the ground in search of food, and while its walk is somewhat jerky, it is graceful, and in moving about the handsome wedge-shaped tail is slightly elevated and constantly twitched; occasionally, as when in a hurry, the ordinary walk is varied to a series of hops. Its flight is never very protracted, and is only resorted to when necessary.

The general habits of the American Magpie vary somewhat in different localities. In some sections, as soon as the snow disappears, birds which have spent the winter months in the vicinity of farms and cattle or sheep ranches (unquestionably attracted to such places by a more abundant food supply) leave them and retire from the immediate vicinity of settlements to take up their housekeeping duties in more secluded localities, while in other places these

birds remain the year around and breed in close proximity to man. At Fort Lapwai, Idaho, more than thirty pairs bred within a radius of a mile of the Post, and several within a hundred yards of some of the houses, in perfectly expo ed situations.

Their food during the greater part of the year consists mainly of insects, especially of the large black cricket (so numerous and destructive in certain seasons in the West), grasshoppers, grubs and larvæ of different kinds, angleworms, crawfish, small mammals, birds, their young and eggs, carrion of all sorts, offal from slaughterhouses, and kitchen refuse generally. In the summer and fall fruits and berries also enter to some extent into their bill of fare. In the winter, when food becomes scarce, they are charged with pecking holes in the backs of sore-backed horses, freshly branded cattle, and scabby sheep. While this is possibly true to a limited extent in exceptionally severe winters, I have never observed it, although stationed on several Indian reservations, where sore-backed ponies were common enough; but I have seen them industriously pecking away at green hides hung out to dry. Mr. John Bucher, of Warner Valley, Oregon, states that he has observed numbers of Magpies on the backs of cattle, in the spring, eating grubs, the larvæ of *Hypoderma bovis*, which infest the backs of old and thin animals, and he is likewise of the opinion they do not confine their attention to the grub alone, but pick at the living flesh as well.

Mr. W. G. Smith, lately of Loveland, Colorado, writes me; "Among other pets I kept a tame Magpie and a lot of guinea pigs. Several of the latter died from some unknown cause. One day I caught the Magpie in the act of pecking out the eye of one; I then examined the dead ones and found that each had both eyes picked out. A charge of shot soon settled the culprit."

The American Magpie is undoubtedly more or less of a rowdy and scapegrace among its kind, but on the whole I think he is not quite as black as usually painted, and while it can not be denied that he does some harm, I must insist that he also does considerable good, and the latter compensates perhaps for all his misdeeds.

The nesting season begins early; in Colorado, northeastern California, southern Oregon, and Idaho, sometimes in the first week of April, and usually by the middle of this month; in Washington and Montana, a couple of weeks later, about the latter part of April or the beginning of May, and in the more northern portions of its range, in the last half of June and beginning of July. In Alaska these birds have been found almost at the borders of the Arctic Circle, and on the Shumagin Islands, the Alaskan Peninsula, and in the more southern portions of the territory; in the vicinity of Sitka, they are not uncommon. Mr. Chase Littlejohn writes that he found them all along the peninsula wherever the alder bushes were large enough to afford shelter and where they could place their nests out of reach of foxes.

The Magpie, once mated, I believe remains so through life. The nest is a bulky and sometimes quite an elaborate affair, and is usually globular in shape. Outwardly it is constructed of sticks, some of which are occasionally 2 feet in

length and nearly an inch in diameter, the coarser material being used for the base of the nest. The inner cup, the nest proper, resembles a Robin's nest somewhat, only larger, and like it is plastered with a coating of wet mud reaching well up on the sides, but not quite to the rim. This coating is carefully lined with fine rootlets, dry grasses, inner bark of the cottonwood tree, and hair; and, in the vicinity of pine forests, with pine needles. The nest is domed over with smaller sticks, and the sides are likewise protected by an open latticework of similar material, thorny twigs being preferred if obtainable. The entrance hole generally opens from the main body of the tree or bush in which the nest is placed, the latter being usually found in the thickest tangle of limbs, provided they are strong enough to support the heavy structure. On good-sized trees the nests are often placed well out on a limb, where they are not readily reached. Some nests which I have seen measured nearly 3 feet in height by 2½ feet in width; others again are much smaller and more flimsily built, scarcely half as large, and only moderately domed; occasionally one is found which is almost open at the top. Mr. B. J. Bretherton, writing from Kadiak, Alaska, mentions a nest there, placed in a dense fir thicket, about 10 feet from the ground. It was built on three saplings which grew in the shape of a triangle, the nest being built around each, the center being supported by the small branches. About 5 inches from the top of the nest a roof was built, open all around. He adds: "A remarkable fact about this bird is its inability to keep dry; in the rainy winters it may be seen day after day hopping around, literally wet to the skin, and looking as if it had been dipped in a bucket of water." The inner cup of the nest measures about 6 inches in width by 4 inches in depth. While on the nest the tail of the bird is usually held at right angles to the body. Unless the eggs are on the point of hatching it is a difficult matter to approach close enough to see the bird on the nest, as the female is exceedingly suspicious and will try to sneak quietly away at the slightest sign of danger, generally slipping out on the side opposite the intruder, as there are usually sufficiently large openings in the sides of the nest to permit the bird to scramble through.

Not infrequently two or three unoccupied nests, built probably by the same pair of birds, are found in close proximity to the one in use; but the same nest is often made use of for several seasons in succession. Two or three pairs sometimes nest close together, but as a rule each pair of birds have their own little canyon or ravine in which they may be found from year to year. Thornbushes, either *Cratægus rivularis* or *douglassi*, commonly found near springy places at the heads of canyons or smaller ravines, as well as in the creek bottoms proper, were preferred as nesting sites by these birds wherever I have observed them. Willow thickets, scrubby cottonwoods, junipers, pines, alders, and firs were also used in the order named. The height of nests from the ground ranged from 4 to 20 feet, rarely over or under this. In Colorado, however, according to Mr. Frederick M. Dille, the Magpie sometimes builds in lofty cottonwoods, from 50 to 60 feet from the ground; and I have seen it stated that occupied nests have been found on the ground, though I have never seen one so situated.

The average number of eggs to a set throughout the greater part of their range is seven; sometimes, however, eight or nine are found. At Fort Lapwai, Idaho, I found sets of nine not at all rare, and have twice taken sets of ten. An egg is deposited daily; incubation does not begin until the clutch is nearly completed, and lasts from sixteen to eighteen days. The female attends to this duty almost exclusively; I rarely saw the male on the nest, but he feeds her, and is quite attentive, being generally on the lookout in the vicinity of the nest. The young when first hatched are ugly-looking creatures, nearly all head, and are blind. They are fed on worms, the soft parts of insects, etc., and grow rapidly. They are able to leave the nest in about three weeks, and soon learn to care for themselves. Only a single brood is raised in a season; if the first set of eggs is taken, a second and even a third is sometimes laid, frequently in the same nest or in another close by. The second set rarely numbers more than five or six eggs.

These show great variation in shape, size, color, and markings, the majority inclining to ovate, while others may be called short ovate, rounded, elliptical, and elongate ovate. The prevailing ground color is a pale or dirty gray, less often a light drab, and occasionally a set is found of a decidedly greenish tinge; but such eggs are rare. They are generally heavily blotched with different shades of brown and ecru drab, these markings being often confluent, almost hiding the ground color, and are usually evenly distributed over the entire egg. In some specimens the markings predominate at the upper end of the egg, more rarely on the lower end. Some also show lavender shell markings, and occasionally a specimen is found in which the markings are well defined, not confluent, and leaving the intervening ground color distinctly visible. The shells of these eggs are close grained, moderately strong, and show little or no gloss.

The average measurement of two hundred and one eggs in the United States National Museum collection is 32.54 by 22.86 millimetres, or 1.28 by 0.90 inches. The largest egg of the series measures 37.84 by 26.42 millimetres, or 1.49 by 1.04 inches; the smallest, 27.94 by 21.59 millimetres, or 1.10 by 0.85 inches.

The type specimen, No. 20349 (Pl. 3, Fig. 11), from a set of ten eggs, Bendire collection, taken by the writer near Fort Walla Walla, Washington, on April 10, 1882, represents an average-marked egg, and No. 25872 (Pl. 3, Fig. 12), a single egg, taken by Mr. F. M. Dille, near Denver, Colorado, represents one in which the ground color shows a decided greenish tint, while No. 26678 (Pl. 3, Fig. 13), from a set of seven eggs, also taken by Mr. F. M. Dille, near Platteville, Colorado, on May 2, 1892, represents a peculiarly shaped and heavily marked specimen.

## 138. Pica nuttalli Audubon.

YELLOW-BILLED MAGPIE.

*Pica nuttalli* Audubon, Ornithological Biography, IV, 1838, 450, Pl. 362.
(B 433, C 233*a*, R 287, C 348, U 476.)

Geographical range: Middle California, west of the Sierra Nevada Mountains only.

The breeding range of the Yellow-billed Magpie is coextensive with its geographical distribution, and it is a constant resident where found. Its habitat, however, is much more restricted than that of its larger relative, and it is only found in the middle portions of the State of California, west of the Sierra Nevada Mountains, from Ventura County in the south to Tehama County in the north, occupying about one-half of the area of the State only. Thirty years ago it was common in many places in the immediate vicinity of the coast where it is but rarely met with now. It resembles the Black-billed Magpie in every particular excepting in the color of the bill which is yellow; this color is brighter in the birds found in the southern portions than in those approaching the range of the American Magpie in northeastern California. It also averages a trifle smaller in size, and its general habits are similar. It is a constant attendant about the various cattle and sheep ranches found scattered through the interior of California, and here it subsists mainly on the offal, carrion, etc., found in the vicinity of such places, this being in addition to its usual diet of grasshoppers, worms, grubs, etc. Small colonies are sometimes found breeding in some secluded canyon in the neighborhood of such ranches, but more often each pair occupy some gulch or ravine by themselves. Their bulky and conspicuous nests are placed in oaks by preference, next in sycamores, willows, and cottonwoods, and sometimes in very exposed situations where they can be readily noticed for quite a distance; generally however, they are well hidden, especially when placed in a thick bunch of mistletoe. They are constructed like those of the preceding species, but are more frequently placed in large trees and rarely in bushes; sometimes three or four nests will be built in the same tree if it be a large one.

Their usual height from the ground varies from 30 to 60 feet, and they are often placed on the extremity of a limb, where they are hard to reach. Some of the nests, besides the usual lining of fine roots, dry grass, pine needles, and hair, contain bits of dry cow dung and the fine inner bark of the cottonwood.

Mr. Rollo H. Beck, of Berryessa, California, writes me that he has noticed the male feeding its mate while incubating, and that the latter would flap her wings and call like a young bird, and according to him their usual call note sounds like "quē, quē, quē," or "quēēk, quēēk."

The average number of eggs laid is about seven. Sets of eight and nine are more rarely found than in the case of the American Magpie. They are indistinguishable from those of that species, but average a trifle smaller, and specimens showing a greenish tinge in the ground color appear to me to be more frequently met with.

The average measurement of sixty-two eggs in the United States National Museum collection is 31.54 by 22.54 millimetres, or about 1.24 by 0.89 inches. The largest egg of the series measures 34.29 by 22.86 millimetres, or 1.35 by 0.90 inches; the smallest, 28.45 by 21.34 millimetres, or 1.12 by 0.84 inches.

The type specimen, No. 25125 (Pl. 3, Fig. 14), Ralph collection, from a set of seven eggs, taken near Valley Springs, California, April 13, 1892, represents one of the lighter-colored types found among the eggs of this species.

## 139. Cyanocitta cristata (Linnæus).

BLUE JAY.

*Corvus cristatus* Linnæus, Systema Naturæ, ed. 10, I, 1758, 106.
*Cyanocitta cristata* Strickland, Annals of Natural History, XV, 1845, 261.
(B 434, C 234, R 289, C 349, U 477.)

Geographical range: Eastern North America; north in the Dominion of Canada to about latitude 52°, and casually to latitude 56°; west to eastern Assiniboia, eastern North and South Dakota, eastern Nebraska and Kansas, the eastern half of the Indian Territory, and northern Texas; south through the United States, excepting Florida, the Gulf Coast, and southeastern Texas during the breeding season.

The Blue Jay, one of our best-known birds, is a resident and breeds throughout the greater portion of its range, but is usually only a summer visitor in the northern parts of the United States and southern Canada, though even there some are occasionally found in midwinter in suitable localities where beechnuts and acorns, on which they principally subsist at such times, are abundant. Few of our native birds compare in beauty of plumage and general bearing with the Blue Jay, and while one can not help admiring him on account of his amusing and interesting traits, still even his best friends can not say much in his favor, and though I have never caught one actually in mischief, so many close observers have done so that one can not very well, even if so inclined, disprove the principal charge brought against this handsome freebooter. He is accused of destroying many of the eggs and young of our smaller birds, and this is so universally admitted that there can be no doubt of its truth.

Mr. Henry Nehrling, for instance, in his charming work, gives the Blue Jay one of the worst possible reputations, based not on mere hearsay evidence, but on personal observations, and he is well known as an exceedingly accurate ornithologist.[1]

Mr. R. M. Kirby Smith, of Sewanee, Tennessee, writes: "The Blue Jay is very abundant in this vicinity, and does a great deal of harm by eating the eggs of smaller birds, particularly those of the Chipping Sparrow. I have often caught them in the act of destroying their nests and eggs."

Mr. J. W. Preston, of Baxter, Iowa, writes me on the same subject as follows: "The Jay in this region has become a veritable nuisance. The smaller species of birds are utterly at its mercy in nesting time, and comparatively few

[1] Die Nordamerikanische Vogelwelt, pp. 493–497.

succeed in rearing a brood of young. It is common in the woods to hear Vireos lamenting for their young which the Jay has forcibly carried away. Vast numbers of eggs are eaten and the nests torn up. From the door of my house I have seen a Blue Jay take and devour the eggs of a Red-eyed Vireo whose nest had been suspended from the tips of a low hickory bough overhanging the pathway."

Mr. Manly Hardy, of Brewer, Maine, fully corroborates these statements, writing me as follows: "It is a great robber of birds' nests, taking both eggs and young. I also feel quite sure that in some cases it kills adult birds. I once saw one pass me with what I thought an unusually large crop. I fired, killing the bird, and found also a slate-colored Junco, which had been pecked some by the Jay, and I believe was killed by him. This occurred in the fall, during the migration of the Juncos. There is little doubt that they destroy many nests of eggs and young; all of the *small birds say so.* Let a Robin or a Pigeon come among them and you hear no outcry, and a Flicker or any other Woodpecker creates no disturbance; but let a Blue Jay, Grackle, or Crow put in an appearance, and every bird in range begins to call him a thief, and I never knew them to slander their neighbors. Just think it over and see how this agrees with your experience."

I might add more evidence to the same effect, but consider it unnecessary and think this charge fully substantiated. However, notwithstanding all his vices, I can not help admiring our Blue Jay, for he has good traits as well. Cunning, inquisitive, an admirable mimic, full of mischief; in some localities extremely shy, in others exactly the reverse, it is difficult to paint him in his true colors. Not a few writers call him a bully and a coward, and perhaps he deserves these names at times; but instances are not lacking which show that he possesses courage in the defense of his young, is a devoted parent, and will sometimes fiercely attack man himself in protecting his nestlings. But it is unfortunate that he shows so little consideration for the feelings of other birds when he despoils them of their young.

What could be more commendable than the following incident, related by Mr. Frithof Kumlien, of Milwaukee, Wisconsin?

"*Reason or instinct?*—I made some observations last summer on the habits of the Blue Jay (*Cyanocitta cristata*) which, if not showing reason, certainly show a degree of sympathy and kindness worthy of imitation by animals of a higher order. Last August (1887), on an old farm in Jefferson County, Wisconsin, my attention was attracted by the notes of a Blue Jay, not the ordinary cry, which could be heard at almost any time, as they are very numerous there, but a series of regular calls, followed by answers from a neighboring tree. There was something so peculiarly suggestive of a communication of thought about the sound that I went to the place, and saw an old Blue Jay perched on a fence, some distance from a tree where there were several others.

"On my nearing the bird the calls from the tree became more frequent and loud, changing from a low, pleasant, communicative tone to a shrill alarm, which became more frequent and intense as I approached. Thinking that he must be

injured in some way I went cautiously up to him, when I found that he was at least partially blind. The eyes were blurred and dim, and the lids nearly closed. I had little difficulty in catching him, and found him to be an old and helpless creature, with scarcely a vestige of his former beauty. The beautiful blue feathers were much faded; in fact, the general appearance of the bird was so different as to be apparent at a glance; the claws were very much worn, the bill dulled, and the primaries and tail feathers ragged. Every feature suggested old age and feebleness. Yet he was cared for and watched as tenderly as was ever a young bird in the nest. No sooner had I caught him than there were at least a dozen Jays close at hand, whose sympathy and interest were manifested as plainly as could be without words. After a thorough examination I liberated him, when he flew in the direction of the sound of the others, but did not succeed in alighting among the smaller branches of the tree, and finally settled on a large limb near the ground. I saw him every day after that (from August 10 to August 17), and never did his companions desert him, some one of them being always near and warning him of approaching danger, whereupon he would fly in the direction indicated by the sound of their voices. They guided him regularly to a spring near by, where I saw him bathe daily, always, however, with some of his companions close by. They not only watched and guided him, but they fed him. I had noticed, some days previously, some Jays carrying food, and thought it strange at that season, as there were no young then to feed, but found afterwards, to my surprise and pleasure, that the poor old blind bird was being fed by those whom he could no longer see.

"About a week after first noticing this bird I was compelled, on account of sickness in the family, to relinquish my observations. There is no doubt whatever that the bird was an old one. The young of the year are easily recognized, not alone by their plumage, but by their peculiar teasing, whining notes, unmistakable to anyone familiar with the species."[1]

The notes uttered by the Blue Jay are quite varied. The ordinary call note sounds like "djäh, djäh," and again like "käh, käh," or "peedunckle, peedunckle," or "cable, cable, cable." I have also occasionally heard them utter a shrill cry resembling that of the peacock, like "piūh, piūh," or "tiūh, tiūh," varied now and then to a loud "pa-há, pa-há." Occasionally, according to Mr. Preston, it produces one like "sid-lit, sid-lit," elevating and lowering the body in unison with this peculiar musical effort. According to Dr. P. L. Hatch, in the "Birds of Minnesota" (p. 262), "it utters notes somewhat like 'hilly-hilly-hilly,' or 'p'wilhilly-p'wilhilly,' followed in a minute afterwards by 'hweeo-hweeo-hweeo,' or 'chillac-chillac-chillac,' after which comes a soft, sweet, metallic note, filled with a sad pathos."

While ordinarily a noisy bird, the careful listener may occasionally be treated to quite a pleasing effort at singing or warbling. Its remarkable powers of mimicry have often been commented on, and it is astonishing how accurately the Blue Jay is able to imitate the various calls, alarm notes, and cries of dis-

[1] The Auk, Vol. V, 1888, pp. 434, 435.

tress of other birds, and of many mammals as well. These will readily deceive anyone, and the Blue Jay seems to delight in playing tricks on its unsuspecting neighbors in this manner, apparently out of pure mischief. They are especially fond of teasing Owls, and occasionally Hawks also, but sometimes with disastrous results to themselves. While in the woods they are comparatively safe; but if one ventures into the open, and the Hawk should get tired of its tormentor and turn on him, the consequences are usually serious for the Blue Jay. His flight is laborious and accomplished only with a good deal of flapping of the wings. He is no match for our smaller Hawks; and even a Kingbird never fails to attack a Blue Jay most vigorously, should it chance to catch one while flying from one wood to another or come anywhere in the vicinity of its nesting site. The Blue Jay knows this, and stays therefore as much as possible in the timber. They are usually found about the edges of clearings, and not infrequently nest in close proximity to houses, where, if not molested, they become very tame and are soon perfectly at home.

Their food consists of all sorts of animal matter, offal, insects, grasshoppers, grubs, worms, mice, etc., and, when procurable, the eggs and young of smaller birds, varied with acorns, beechnuts, chestnuts, corn, and fruits of different kinds. They are not at all particular when hungry, but will eat almost any thing, and have been seen picking up raw potato peelings, old dried-up apples, etc. Where they are resident they lay up quite a store of acorns, corn, and nuts in various places for winter use, but where they are only summer visitors they do not resort to this practice. In the fall they congregate in large flocks preparatory to their migrations. They usually leave their summer homes in the latter part of September, returning again late in April or early in May.

Mr. W. W. Cooke states: "The Nueces Canyon, in southwestern Texas, is said to be the winter home of countless myriads. In that case they must migrate to the northeast, for all observers agree that in northwestern Texas they are rather a rare bird."[1]

Throughout the greater part of the year the Blue Jay is a more or less restless, noisy, and roving bird, moving in little companies from one wood to another; during the nesting season it becomes more quiet and retiring, and is less often seen or heard. It prefers mixed woods to live in, especially oak and beech woods, but for nesting sites dense coniferous thickets are generally preferred; oaks, elms, hickories, and various fruit trees, thorn bushes, and shrubbery overrun with vines are also used, the nests being placed in various situations, sometimes in a crotch or close to the main trunk, or on the extremity of a horizontal limb, among the outer branches. They are placed at distances from the ground varying from 5 to 50 feet, but usually below 20 feet. In the more southern parts of their range nest building begins in the latter part of March, and full sets of eggs may be looked for by April 15. In our Middle States it nests a couple of weeks later, and in the northern portions frequently not before June. I believe but one brood is usually reared in a season, but in the South they may occasionally raise two.

[1] Bird Migration in the Mississippi Valley, Bulletin II, U. S. Department of Agriculture, 1888, p. 157.

The nests are generally well hidden, and are rather bulky but compactly built structures, averaging from 7 to 8 inches in outer diameter by 4 to 4½ inches in depth; the inner cup measures about 3½ to 4 inches in diameter by 2½ inches in depth. Outwardly they are composed of small twigs (thorny ones being preferred), bark, moss, lichens, paper, rags, strings, wool, leaves, and dry grasses, the various materials being well incorporated and sometimes cemented together with mud, but not always; the lining is usually composed exclusively of fine rootlets. Occasionally the Blue Jay will take the nest of another species by force.

Mr. W. E. Loucks, of Peoria, Illinois, writes: "A nest of a pair of Robins, built in an elm tree, was stolen and appropriated by a pair of these birds. It was fitted up to suit their needs, and eggs were deposited in it before the eyes of the angry Robins."

Judge J. N. Clark, of Old Saybrook, Connecticut, found a nest of the Blue Jay, in the spring of 1883, in a rather curious place. It was built among the roots of a large tree that had been prostrated by the wind, turning up a large mass of roots, with the adhering soil. Near the top of this mass, some 8 feet from the ground, under the border of the turf, which had curved over, making a screen, the nest, with its five eggs, was neatly hidden from view.[1]

The number of eggs to a set varies from three to six; sets of four or five are most often found, and an egg is deposited daily. Both sexes assist in incubation, which lasts from fifteen to sixteen days. The young grow rather slowly, and are fed on insects, worms, and animal food. They often leave the nest before they are fully feathered, and when scarcely able to fly. At this time they frequently betray their presence by their incessant clamor for food, never appearing to get enough to satisfy their enormous appetites. The parents are exceedingly devoted to them, and are close sitters. Instances have been recorded where a female Blue Jay allowed her head and back to be stroked while sitting on her eggs. The eggs of the Blue Jay vary greatly in their ground color. In some this is olive green, olive buff, and pea green; in others it is plain buff color, or again cream and vinaceous buff. This is irregularly spotted and blotched with different shades of browns and lavender, the markings being generally heaviest about the larger end. A peculiar set of three eggs in the United States National Museum collection has a pale bluish-green ground color, with only a few rather large blotches of slate and lavender about the larger end, and one of these eggs is almost unspotted. The shell is smooth, close grained, rather strong, and occasionally slightly glossy. The eggs are usually ovate in shape.

The average measurement of one hundred and thirty-five eggs in the United States National Museum collection is 28.02 by 20.44 millimetres, or about 1.10 by 0.81 inches. The largest egg of the series measures 30.48 by 21.59 millimetres, or 1.20 by 0.85 inches; the smallest, 25.15 by 20.07 millimetres, or 0.99 by 0.79 inch.

[1] Ornithologist and Oologist, Vol. 8, 1883, p. 78.

The type specimen, No. 20372 (Pl. 5, Fig. 5), Bendire collection, from a set of three eggs, taken June 11, 1876, near Muscatine, Iowa, and No. 25883 (Pl. 5, Fig. 6), Ralph collection, from a set of five eggs, taken by Dr. William L. Ralph, near Floyd, Oneida County, New York, represent the two prevailing types of coloration of the eggs of this species.

## 140. Cyanocitta cristata florincola Coues.

FLORIDA BLUE JAY.

*Cyanocitta cristata florincola* Coues, Key, ed. 2, 1884, 421.
(B —, C —, R —, C —, U 477*a*.)

Geographical range: Florida and the Gulf coast to southeastern Texas; casually to southwestern Texas (Bexar County).

The Florida Blue Jay is a slightly smaller bird than its northern relative, and is a common resident in certain localities, breeding throughout its range. It is somewhat duller in plumage than the latter, the white on the tips of the secondaries and tail feathers being more restricted. It has been taken in southern Louisiana, and the late Mr. Charles W. Beckham found it at Leon Springs, some 20 miles northwest of San Antonio, in March, 1887, this being the most westerly record for this subspecies. It is evidently rare in that vicinity, as Mr. H. P. Attwater does not give it in his list of birds observed in the vicinity of San Antonio, Texas.

It is quite common in many parts of Florida, and Dr. William L. Ralph has taken several nests and eggs in the neighborhood of San Mateo, Florida. He tells me that its general habits are similar to those of the Blue Jay, and one of its favorite foods here is the seed of the cabbage palmetto. Where not much molested it becomes even tamer and more familiar than its northern relative, and breeds like it in the vicinity of houses, among the orange groves. Two nests found by Dr. Ralph were placed in low, flat pine woods, 25 and 30 feet, respectively, from the ground; these were composed of twigs, Spanish moss, pine needles, and pieces of cloth, and lined with fine roots. In some of the nests the materials were cemented together with mud. A third nest was placed in an orange tree standing within a few feet of a house, near the banks of the St. John's River, about 20 feet from the ground; it was composed of twigs, catkins, plant fibers, weeds, grasses, pieces of string, and a little Spanish moss, and these materials were cemented together with mud; the lining consisted entirely of wire grass (*Aristida*). Another nest was placed among some small branches at the end of a limb of an orange tree, about 11 feet from the ground, and was composed of similar materials outwardly, but no mud was used in its construction, and it was thickly lined with fine rootlets of the orange tree.

The average measurement of two nests is about 8 inches in outside diameter by 4 inches in depth, the inner cup measuring about 4 inches in diameter by $2\frac{1}{4}$ inches in depth.

In the vicinity of San Mateo, Florida, the only point from which I have any breeding records, nidification begins sometimes in the second week of April and lasts through this month. The earliest date on which Dr. Ralph took a set of eggs was April 17; incubation was then advanced about one-third; the latest, May 4, incubation being advanced one-fourth. Probably two broods are raised here in a season. The eggs of this subspecies are indistinguishable from those of the former, and the same description will answer equally well for both.

The average measurement of sixteen eggs in the United States National Museum collection is 27.83 by 20.63 millimetres, or about 1.10 by 0.81 inches. The largest egg measures 29.21 by 20.32 millimetres, or 1.15 by 0.80 inches; the smallest, 25.40 by 20.83 millimetres, or 1 by 0.82 inches.

The type specimens, Nos. 24990 and 25593 (Pl. 5, Figs. 7 and 8), from sets of three and four eggs, Ralph collection, were taken by Dr. William L. Ralph, near San Mateo, Florida, the first on April 30, 1891, the last on May 4, 1892, and represent average-colored eggs of this subspecies.

## 141. Cyanocitta stelleri (Gmelin).

STELLER'S JAY.

*Corvus stelleri* Gmelin, Systema Naturæ, I, 1788, 370.
*Cyanocitta stelleri* Strickland, Annals of Natural History, XV, 1845, 261.
(B 435, C 235, R 290, C 350, U 478.)

Geographical range: Northwestern North America; from northern California north to southern Alaska; east to the Cascade Mountains of Oregon, Washington, and in western British Columbia, on both slopes.

Steller's Jay, also known locally as the "Mountain" or "Pine" Jay, is a well-known member of the fauna of the northwest coast, and is sure to be heard from wherever found. Like its relative, the common Blue Jay, it is an incessant scold, never at rest, fully as inquisitive, prying into the domestic affairs of other birds, and, I think, equally destructive. It is usually a constant resident and breeds wherever found. It is an inhabitant of the canyons and pine-clad slopes of the higher mountains, and is not as often seen in the deep forests as on their outskirts near water courses. Although rarely molested throughout its range, where collectors are few, it is exceedingly shy and more difficult to approach within shotgun range than is the Blue Jay. I found this species quite common in the vicinity of Fort Klamath, in southwestern Oregon, and I had abundant opportunities to observe it closely. This locality forms nearly the southern limit of its range, and specimens intermediate between the Blue-fronted and the Black-headed Jays are occasionally found there, but the majority of the birds are referable to this species. During the winter months, especially when heavy snows covered the ground, small parties of these Jays now and then paid visits to the back yard of my quarters in search of kitchen refuse, and most of the specimens obtained by me were killed or caught in steel traps while so

engaged. To hunt them successfully in the open takes both time and patience. Should you see one flying into the lower parts of a bushy fir or spruce and think you had your specimen located, before you could get within shooting distance you might now and then catch a glimpse of him hopping up from limb to limb, always keeping close to the trunk and moving up spirally, and by the time you were close enough you would fail to find the bird where you expected, but perhaps hear his harsh note of warning or derision from some other tree ahead. They seem to delight in teasing the would-be collector in many ways.

Like the Blue Jay, they are expert mimics, and I have been deceived by them on more than one occasion; they can imitate to perfection the notes of all the Raptores found within their range and seem to take pleasure in doing so, probably to impose on the numerous small birds in their vicinity. They are omnivorous, and while pine seeds undoubtedly form a considerable part of their daily bill of fare during the winter months, scarcely anything edible comes amiss. I have seen them, after eating their fill of kitchen refuse, carry off large pieces of meat, bread, etc., hide them somewhere near, and come back at once for more, keeping up their visits until nothing remained. Their strong feet are used in grasping and holding the food, which is torn off in pieces suitable for swallowing. On these foraging expeditions they are silent and constantly on the lookout for danger.

Their ordinary call notes are harsh and discordant, some resembling certain of those of the Magpie, and others the querulous notes of the Red-breasted Sapsucker, which they are especially fond of mimicking. A note frequently heard while flying from one tree to another sounds like "qŭerk, qŭerk," sometimes rapidly repeated; another, while at rest in some bushy thicket, resembles a shrill whistle, like "twee-ish, twee-ish." In the early spring I have occasionally heard one of these birds make a very fair attempt at singing, uttering a series of low, musical, warbling notes, intermixed sometimes with a shrill whistle. They are not as social as many other species of this family, and it is rare to see more than a dozen together at any time, this occurring only in winter, when two or three families may join together in a foraging expedition.

In the southern parts of their range nest building begins late in March or early in April, and correspondingly later northward. At Fort Klamath I noticed them gathering nesting materials during the first week in April, and all the nests I found there (five in number) were placed at the extremities of large horizontal limbs of the highest pine trees, near water, generally from 40 to 50 feet from the ground, and in positions practically inaccessible. The birds seemed to realize this, and were not at all particular about hiding their nests, as the majority could be easily seen from below. Usually they prefer bushy fir trees, which appear to be their favorite nesting sites throughout the greater part of their range; now and then a vine, a maple, or a hawthorn bush is selected.

Mr. A. W. Anthony writes me: "Steller's Jay is common about Beaverton, Oregon. A nearly finished nest was discovered on March 31, in a fir sapling, about 10 feet from the ground. The first egg was deposited on April 10, and

one on each consecutive day until the 14th, when the set of four was taken. The nests I have seen were placed close to the trunks of small firs, usually in very dense second-growth thickets, not over 25 feet from the ground."

Mud forms an important item in all the nests I have examined. They vary from 5 to 60 feet in height from the ground. A nest of this species now before me was saddled on a small limb of a leaning fir, 10 feet from the ground and 30 feet from the bottom of a bank. Outwardly it is composed of small twigs, moss, and dry grass, the whole well cemented with mud up to the rim of the nest; it is lined with a thick layer of fine roots; outer diameter, 9 inches by 6 inches deep; the inner cup of the nest is $4\frac{1}{2}$ inches in diameter by $2\frac{1}{2}$ deep. It was taken by Messrs. Cooke and Warner, near Salem, Oregon, April 26, 1891, and contained four fresh eggs. The female was on the nest, while the male kept out of sight, a short distance away, until the former left the nest, when he appeared and kept up a constant chatter until shot. The female was also taken; both parents were forwarded with the nest and eggs, and are now in the United States National Museum collection. The nest was well concealed from view from the top of the bank, but easily seen from an old road running along the foot of the bluff. Full sets of eggs may usually be looked for during the latter part of April and the first two weeks in May.

Incubation, in which the male assists to some extent, lasts about sixteen days, and I believe usually only one brood is raised in a season. The young follow the parents for some time, and are cared for several weeks after leaving the nest. The number of eggs to a set varies from three to five; sets of four are most often found. They are a dull, pale bluish-green in ground color, and are spotted and blotched over their entire surface with irregularly shaped markings of different shades of brown and lavender, which are usually most numerous about the larger end of the egg. In shape they vary from ovate to elongate ovate. The shell is finely granulated and strong, with little or no gloss.

The average measurement of ten eggs is 31.50 by 23.37 millimetres, or about 1.24 by 0.92 inches. The largest egg measures 34.04 by 23.62 millimetres, or 1.34 by 0.93 inches; the smallest, 29.46 by 22.61 millimetres, or 1.16 by 0.89 inches.

The type specimen, No. 24388 (Pl. 5, Fig. 9), from a set of four eggs, taken by Messrs. Cooke and Warner, near Salem, Oregon, on April 26, 1891, represents a typical egg of this species.

## 142. Cyanocitta stelleri frontalis (Ridgway).

BLUE-FRONTED JAY.

*Cyanura stelleri* var. *frontalis* Ridgway, American Journal of Sciences and Arts, 3d ser., V, Jan., 1873, 41.

*Cyanocitta stelleri* var. *frontalis* Boucard, Catalogue Aves, 1876, 279.

(B —, C 235*b*, R 290*a*, C 353, U 478*a*.)

Geographical range: Western North America; from northern Lower California north through the coast ranges of California and Oregon to northwestern Washington (and southern British Columbia?); east to both slopes of the Sierra Nevada Mountains, in California and Nevada; apparently not present in the Cascade Mountains of Oregon and Washington.

The range of the Blue-fronted Jay, also known as the "Sierra Jay" and "California Mountain Jay," has recently been extended considerably to the northward by Mr. R. H. Lawrence, who found it not at all rare in western Washington, in the Puget Sound region, and it is presumable, therefore, that it is also found throughout the coast ranges of Oregon, occupying here the same ground as the preceding species.

No typical specimens of this race from any portion of Oregon have, to my knowledge, been brought to the notice of ornithologists. It undoubtedly intergrades with Steller's Jay in northern California and southern Oregon, as at Fort Klamath, for instance, where I have found intermediates between these races. The majority of the birds found there, however, come nearer to *Cyanocitta stelleri* than to the present race.

Mr. L. Belding found the Blue-fronted Jay in the northern parts of the Peninsula of Lower California, at Valle Palmas, Vallecitas, and Guadalupe Canyon, in May, 1885.[1]

It reaches its eastern limits on the eastern slopes of the Sierra Nevadas, where it is common in places up to 9,500 feet. Dr. C. Hart Merriam's parties failed to observe it in any of the desert ranges east of these mountains during their extended explorations of the Death Valley country in the summer of 1891.

While essentially a bird of the coniferous forests and rarely found any distance away from these, excepting in winter when small parties visit occasionally the more open regions at the base of the foothills, in some parts of California it is more or less a resident of the oak belt as well.

Mr. R. H. Beck writes me: "It is a common resident of the Santa Clara Valley, California, as well as of the coast ranges, from Santa Cruz to 40 miles below Monterey, wherever I have been. I have found about a dozen of their nests, placed in oaks, buckeye, laurel, and holly bushes, at various distances ranging from 7 to 40 feet from the ground. They were always found close to the water. These birds are close sitters, and I have seen them remain on the nest until I nearly touched them, when they would fly off a short distance, screaming and calling for their mates, who soon appeared and helped to make a louder

[1] Proceedings of the California Academy of Sciences, 2d series, Vol. II, 1889, p. 293

racket. On one occasion while walking up a canyon I saw a couple of Warblers darting at one of these Jays, which seemed much afraid of them. He would try to get on the under side of the limb he was on, dodge his head, call for help, and sometimes strike at them. Several times while taking their eggs I have seen these birds pecking viciously at the limb they were on, like a Woodpecker, evidently venting their spite in this manner. One of their call notes sounds like 'chuck, chuck,' another like 'ké-lup, ké-lup,' varied to 'que-quer-que' occasionally, and a note of distress or anger sounds like 'că-răck, că-răck.'"

Mr. F. Stephens informs me that they are fond of acorns, and give the California Woodpeckers considerable employment in chasing them away from their supplies stored away in the bark of the pines.

Mr. Charles A. Allen, of Nicasio, California, says: "The notes of the Blue-fronted Jay are variable, at times harsh and rasping, and again very soft and melodious. They will imitate the call of the Western Red-tailed Hawk so perfectly that I have many times been almost deceived by them. I have satisfied myself beyond dispute that they are wonderfully sweet songsters. Many times I have seen them sitting alone in the shade of thick redwood trees singing as sweetly as any bird I ever heard. I presume the male bird is the songster; I have never shot one at such a time to find out; it always appeared to me as though the bird retired to the solitude of the heavy redwood forests to enjoy his solo undisturbed."

Like Steller's Jay, they are omnivorous, living indiscriminately on both animal and vegetable matter, while acorns, as well as pine seeds, form no inconsiderable part of their food. Like other members of this family, they are very destructive to the young and eggs of smaller birds; but they also have their enemies.

Among some manuscript notes kindly loaned me by Mr. L. Belding I find the following item:

"At Big Trees, Calaveras County, California, May 30, 1879, I found a nest of this bird in a cluster of small cedars, about 6 feet from the ground. It was composed of sticks, mixed with mud and leaves, and lined with pine needles. It contained young birds about a week old. Three days afterwards, having shot a Cooper's Hawk not far from this nest, and noticing that it had recently made a meal of young Jays, I repaired to the place, and, as I had conjectured, found they were missing. When I remembered the annoyance these Jays had caused the small birds in their neighborhood, I felt that they merited the loss of their offspring. The Blue-fronted Jay is credited with giving deer and other game notice of the hunter's approach (and doubtless this is correct as far as deer are concerned), often following them with its characteristic cries, and I have on several occasions been notified by them of the presence and approach of deer, and once found, through the instrumentality of Jays, one of these animals which I had wounded."

The Blue-fronted Jay, in some portions of its range, shows a predilection for nesting in natural cavities in trees and stubs, which is a radical departure from its ordinary mode of nesting. The late Col. N. S. Goss wrote as follows on

this subject: "While collecting birds and their eggs in company with my brother, Capt. B. F. Goss, in the spring of 1884, in the vicinity of Julian, California, we found a number of the nests of the Blue-fronted Jay, and in all cases but one in holes and trough-like cavities in trees and stubs, ranging from 4 to 50 feet from the ground, generally 10 to 20 feet up."[1]

Since the construction of the Central Pacific Railroad over the Sierra Nevadas many of the Jays nest in the extensive snowsheds found along the line of this road, and numbers of their nests are yearly torn down by the railroad employees; but this does not appear to discourage them, as they continue to build new nests in similar localities. Besides the trees and shrubs already mentioned as being used for nesting sites by this subspecies, it also builds occasionally in sycamores and willow thickets, although firs, cedars, and pines are most often used. Birds breeding in the higher mountains retire in the late fall to lower altitudes, wintering usually in the foothills, from 2,000 to 4,000 feet above sea level.

The nests are similar in size and construction to those of Steller's Jay, and the same description will answer for both. Occasionally one is lined with pine needles in lieu of rootlets. Nidification commences sometimes in the latter part of April, more frequently in May, and now and then it is delayed into June. The number of eggs to a set varies from three to five, sets of four being most common. An egg is deposited daily, and incubation lasts about sixteen days. The male assists in these duties, and usually but one brood is raised in a season. The eggs resemble those of Steller's Jay, in shape, ground color, and markings, but they average a trifle smaller, and the same description will answer for them.

The average measurement of forty-eight eggs in the United States National Museum collection is 30.22 by 22.61 millimetres, or 1.19 by 0.89 inches. The largest egg of the series measures 34.04 by 23.88 millimetres, or 1.34 by 0.94 inches; the smallest, 28.19 by 22.35 millimetres, or 1.11 by 0.88 inches.

The type specimen, No. 24964 (Pl. 5, Fig. 10), Ralph collection, from a set of four eggs taken near Santa Cruz, California, on April 30, 1876, represents one of the lighter-colored types of the series.

## 143. Cyanocitta stelleri macrolopha (Baird).

LONG-CRESTED JAY.

*Cyanocitta macrolopha* Baird, Proceedings Academy Natural Sciences, Philadelphia, June, 1854, 118.

*Cyanocitta stelleri macrolopha* Coues, Bulletin of the Nuttall Ornithological Club, V, April, 1880, 98.

(B 436, C 235*a*, R 290*b*, 290*c*, C 352, U 478*b*.)

Geographical range: Southern Rocky Mountains; north to southern Wyoming; west to the Uintah Mountains, in eastern Utah, and the higher ranges of northwestern Arizona; south to northern Mexico.

The Long-crested Jay is a resident of the southern Rocky Mountain regions and breeds wherever found. Mr. F. Stephens reports it as common among the pine forests of the Chiricahua Mountains, in southern Arizona.

[1] The Auk, Vol. II, 1885, p. 217.

Dr. Edgar A. Mearns observed it in the San Francisco Mountains, in northern Arizona, and says: "It is a resident to the altitude of 10,000 feet, ascending still farther. On the San Francisco Mountains I found its nest, with fresh eggs, at the upper limits of the pines, in the second week in June, 1887, while the nests found in the lower Mogollons during the last third of May of the same year all contained young."[1]

Mr. W. G. Smith writes: "I found these Jays very common in the mountains of Colorado at all seasons, but during winter they prefer lower altitudes, coming around the houses about the towns, and they are not particular then upon what they feed. At such times they are rather tame and noisy, and, like all Jays, very active. In Larimer County, Colorado, they begin breeding early in May, but I have taken sets of fresh eggs at an altitude of about 9,000 feet in the middle of June, and in favorable seasons I think they breed much higher still. Although their nests are bulky, yet they are rather difficult to find. The birds are very quiet during the nesting season, and are then rarely seen. The female sits very close, and will allow you almost to touch her before leaving the nest. On account of the early date on which they nest, their eggs are sometimes frozen and then abandoned. I have occasionally found one or two eggs in this condition. After the entire clutch is laid I think they are never left unprotected. During the breeding season these birds are perfect terrors to all smaller birds, incessantly hunting for their eggs and young, of which they devour great numbers. I have seen spirited combats between them and other birds, especially Robins, at whose cries of alarm all of the species within hearing distance hastened to help to fight off their common enemy, which they frequently succeeded in doing. Even the little Pigmy Nuthatches are capable of driving away these wholesale destroyers. I have noticed them hiding grains of Indian corn in cracks and under the bark of trees, providing for a possible scarcity of food in the future."

Their general habits and call notes resemble those of the preceding subspecies. Their nests are usually placed in small bushy pines or other conifers, at no great distances from the ground, varying mostly from 8 to 15 feet.

Lieut. Harry C. Benson, United States Army, found the Long-crested Jay breeding near Fort Stanton, New Mexico, in May, 1884.

A nest and four eggs, presented to the United States National Museum collection by Mr. Denis Gale, were found near Gold Hill, Boulder County, Colorado, in a black willow, 9 feet from the ground, at an altitude of 5,500 feet, on April 23, 1889, the earliest breeding record I have for this subspecies. Four sets of eggs in the Ralph collection, obtained in Estes Park, Colorado, were taken, respectively, on May 3, 9, 21, and 25; all of the eggs were fresh when found, excepting those of the last date, in which incubation had commenced. The breeding season, in Colorado at least, appears to be at its height in this month, but in the higher mountain ranges it is protracted into June, while in the mountains in southern Arizona it probably commences early in April.

[1] The Auk, Vol. VII, 1890, p. 256.

The nests of the Long-crested Jay, of which several are before me, resemble those of the preceding subspecies in general construction, and mud enters largely into their composition. While they vary but little outwardly in size and bulk; the inner cup shows more variation, ranging from $3\frac{1}{2}$ to $4\frac{1}{2}$ inches in diameter, and $2\frac{1}{4}$ to $2\frac{3}{4}$ inches in depth. The inner lining consists mostly of small rootlets, in one instance considerable horsehair being intermixed, while in another the lining consists principally of grass and pine needles.

The eggs vary from three to six in number, sets of four or five being most often found. They are indistinguishable from those of Steller's Jay, with the exception of being perhaps a trifle more glossy. Their breeding habits are also similar.

The average measurement of thirty eggs in the United States National Museum collection is 30.94 by 22.35 millimetres, or 1.22 by 0.88 inches. The largest egg of the series measures 33.78 by 23.62 millimetres, or 1.33 by 0.93 inches; the smallest, 27.94 by 21.59 millimetres, or 1.10 by 0.85 inches.

The type specimen, No. 23774 (Pl. 5, Fig. 11), from a set of five eggs taken by Lieut. H. C. Benson, Fourth Cavalry, United States Army, near Fort Stanton, New Mexico, in May, 1884, represents a large and boldly marked egg, while No. 24444 (Pl. 5, Fig. 12), also from a set of five eggs, Ralph collection, taken in Estes Park, Colorado, on May 25, 1890, represents in its markings an average egg of this subspecies.

## 144. Cyanocitta stelleri annectens (Baird).

BLACK-HEADED JAY.

[*Cyanura stelleri*] var. *annectens* Baird, History of North American Birds, II, 1874, 281 in text.

*Cyanocitta stelleri annectens* Ridgway, Proceedings U. S. National Museum, III, August 24, 1880, 184.

(B 436, part; C 235*a*, part; R 290*b*; C 352, part; U 478*c*.)

Geographical range: Northern Rocky Mountains; south to southern Wyoming and northern Utah (Wasatch Range); west to Oregon and Washington, east of the Cascade Mountains.

The Black-headed Jay is a resident of the northern Rocky Mountain regions of the United States, and doubtless occurs also in corresponding localities in the southern parts of British North America, in eastern British Columbia, and in the Province of Alberta.

Mr. Robert Ridgway found it breeding in Parley's Park, in the Wasatch Mountains, Utah, June 25, 1869, which mark about the southern limits of its range. "The nest was placed in a small fir tree on the edge of a wood. It was saddled on a horizontal branch, about 15 feet from the ground, and contained six eggs. The base of the nest was composed of coarse, strong sticks, rudely put together. Upon this was constructed a solid, firm plastering of mud of a uniform concave shape, lined with fine, wiry roots. The external diameter

is about 9 inches, and the height of the nest 4 inches. The interior is 5 inches in diameter and 3 in depth."[1]

I have met with this subspecies in the Bitter Root Mountains, in Montana and Idaho, as well as in the Blue Mountains of Oregon and Washington; but it appeared nowhere to be common. At Fort Walla Walla, Washington, I shot a number of these birds during the winter months, when they left the mountains and foraged about the settlements in the valleys. At such times I have frequently seen them among the willows along creek bottoms, fully 20 miles from the nearest pine timber. I sent eleven skins, taken in this locality, to Mr. William Brewster, of Cambridge, Massachusetts, who pronounced five of them typical *Cyanocitta stelleri annectens*, and two nearly typical *Cyanocitta stelleri*, and four intermediate between these two forms.

Dr. C. Hart Merriam reports this Jay as very rare in south central Idaho, but found it common, in 1872, in the Teton Basin, near the boundary line between Idaho and Wyoming.[2]

I failed to notice any difference in their habits from those of Steller's Jay, excepting that they appeared to be less noisy, and on this account they are perhaps less often observed.

The only eggs of this subspecies in the United States National Museum collection are three, from the set previously referred to as taken by Mr. Robert Ridgway. They resemble the eggs of the three preceding subspecies in every particular, and measure, respectively, 31.50 by 21.34, 32 by 21.84, and 32 by 22.35 millimetres; or 1.24 by 0.84, 1.26 by 0.86, and 1.26 by 0.88 inches.

The type specimen, No. 15431 (not figured), from an incomplete set of six eggs, was taken by Mr. Robert Ridgway, in Parley's Park, Utah, as previously stated.

## 145. Aphelocoma floridana (Bartram).

FLORIDA JAY.

*Corvus floridanus* Bartram, Travels in Carolina, 1791, 291.
*Aphelocoma floridana* Cabanis, Museum Heineanum, I, 1851, 221.
(B 439, C 236, R 291, C 354, U 479.)

Geographical range: Florida.

The range of the Florida Jay, locally known as the "Scrub" or "Bush" Jay, appears to be confined to the Florida Peninsula, and even there it is only found in certain localities. As far as I am able to learn, it has not yet been observed north of St. Augustine or south of Lake Worth, on the east coast; nor north of Pine Point and south of Punta Rassa, on the Gulf coast. It therefore occupies only a comparatively small area of the State. In certain sections of Florida, especially near the coast, and close to some of the larger rivers, sandy ridges are found which produce an almost impenetrable thicket of low, scrubby

[1] History of North American Birds, 1874, Vol. II, pp. 281, 282.
[2] North American Fauna, No. 5, U. S. Department of Agriculture, 1891, p. 99.

oaks, mixed here and there with stunted pines, none of these bushes attaining a height of more than 10 feet, and these "scrubs," as they are locally called, are the home of the Florida Jay. They are not found in the more open pine forests, nor in the extensive swamps so abundant in this State, and are rarely seen any distance away from the oak thickets.

Their food, like that of the rest of this family, consists of insects, grubs, wood ticks, snails, offal, and other animal matter, various seeds, fruits, and acorns, and they are likewise charged with being very destructive to the young and eggs of other birds. Their call notes are said to be somewhat similar to those of the Blue Jay, but on the whole perhaps not so loud and harsh. Where not unduly molested they become quite tame and familiar, and will allow themselves to be approached closely. Dr. Ralph says that he stopped one night at the house of a settler, near Titusville, Florida, who lived some distance from other settlers. He was evidently a friend of the feathered tribe, his only neighbors. On his calling or whistling, several Florida Jays, Cardinals, and Mockingbirds would quickly appear, alight on his head and shoulders, and take the food out of his hands. They were equally familiar with strangers, fighting and quarreling among themselves for choice places on their persons. It is astonishing how quickly some birds, as well as mammals, lose all their fear and become almost domesticated if treated kindly, and that lonely settler undoubtedly passed many a pleasant hour in company with his feathered friends. Their flight is slow, evidently laborious, and is said to resemble that of the Mockingbird somewhat. A good deal of their time is spent on the ground, where they are far more at home than on the wing, moving with the greatest ease and dexterity through the densest thickets and undergrowth.

In favorable localities they are said to breed in communities, a number of pairs nesting in close proximity to each other. In the more southern parts of their range nidification begins sometimes in March, but generally they nest more frequently in April and May, and sometimes even as late as the middle of June, which looks as if two broods might now and then be raised in a season.

The eggs of the Florida Jay range from three to five in number, and their ground color varies from pea green to pale glaucous green. They are blotched and spotted with irregularly shaped markings of cinnamon rufous and vinaceous cinnamon, these being generally heaviest about the larger end of the egg. They are usually ovate in shape, though an occasional set may be called elongate ovate; the shell is smooth and compact, and shows but little gloss.

The average measurement of thirty-six eggs in the United States National Museum collection is 27.31 by 20.32 millimetres, or about 1.07 by 0.80 inches. The largest egg of the series measures 30.78 by 20.57 millimetres, or 1.21 by 0.81 inches; the smallest, 24.64 by 20.07 millimetres, or 0.97 by 0.79 inch.

The type specimen, No. 24704 (Pl. 5, Fig. 13), Ralph collection, from a set of three eggs, was taken near Daytona, Volusia County, Florida, on May 14, 1891, and represents a small-sized but average-colored egg of the series.

## 146. Aphelocoma woodhousei (Baird).

WOODHOUSE'S JAY.

*Cyanocitta woodhousei* Baird, Birds of North America, 1858, Pl. 59.
*Aphelocoma woodhousei* Ridgway, Field and Forest, June, 1877, 208.
(B 438, C 236*a*, R 292, C 355, U 480.)

Geographical range: Western United States; north to southeastern Oregon, southern Idaho and Wyoming; east to Colorado and New Mexico; west to Nevada and southeastern California; south through Arizona, New Mexico, and western Texas into northern Mexico.

Woodhouse's Jay is an inhabitant of the southern Rocky Mountain regions and the ranges of the Great Basin between the former and the Sierra Nevadas. Besides the localities already mentioned, it is common in many parts of Utah. During the biological survey made under the direction of Dr. C. Hart Merriam, in the Death Valley region of southeastern California, in the spring and summer of 1891, Woodhouse's Jay was found on all of the desert ranges which furnish a growth of piñon or juniper. In California it was observed in the White Mountains, Inyo, Argus, Coso, and Panamint ranges; in Nevada, in the Charleston, Grapevine, Juniper, and Pahroc mountains, and in Utah, in the Beaverdam Mountains. In the latter part of June young which were able to fly were found among the willows along the streams in the Panamint Mountains, north of Telescope Peak.[1]

Mr. Robert Ridgway found these birds very abundant in various parts of Nevada, and also met with them in Utah and at City of Rocks, Idaho. I observed this species on the southern slopes of Steens Mountain, in southeastern Oregon, in August, 1877, which locality marks about the northwestern limits of their range.

Mr. Charles E. Aiken was, I believe, the first naturalist who took the nests and eggs of this Jay, and he sent me several sets taken in El Paso County, Colorado, in 1873.

Dr. Elliott Coues, in his Birds of the Northwest, states: "It is very abundant in the upper parts of Arizona, and widely and equally distributed in all sorts of places, with the exception, perhaps, of the recesses of pine woods, which are generally relinquished in favor of the long-crested species. Its preference, however, is for oak openings, rough, broken hillsides covered with patches of juniper, manzanita, and yuccas, bushy ravines, and wooded creek bottoms."[2]

Mr. William Lloyd, in his List of Birds of Western Texas, says regarding this species: "Resident wherever there is shin oak, at the heads of nearly all creeks. Tolerably common. Nest with three eggs found April 19, 1885, on Spring Creek, in low underbrush; another, same date and position of nest, with three young."[3]

[1] North American Fauna, No. 7, U. S. Department of Agriculture, 1893, p. 69.
[2] U. S. Geological Survey of the Territories, No. 3, 1874, p. 220.
[3] The Auk, Vol. IV, 1887, p. 290.

Mr. Scott found Woodhouse's Jay a common and resident species at the head waters of Mineral Creek, and also common in the foothills of the Catalina Mountains, in southern Arizona. He says: "It frequently associates with *Aphelocoma sieberii arizonæ*, but it is not so gregarious as that species. Breeds in late April and May, and I think but one brood is reared. As far as I am able to judge, this species does not range below 3,000 nor above 5,000 feet in the foothills of the Catalina Mountains. I have not met with it at other points than those indicated in the Pinal and Catalina mountains."[1]

Like the rest of the Jay family, the notes of Woodhouse's Jay are quite varied and not unlike those of the California Jay. Its food also is similar, and in regions where oaks or nut pines are abundant consists principally of the fruit of these trees, various insects, and presumably also of the young and eggs of smaller birds. They are apparently equally as adept at thieving as are the better-known species of this family, and probably do fully as much damage. They range up to an altitude of 7,000 feet in summer.

Capt. W. L. Carpenter, United States Army, found it breeding near Prescott, Arizona, on June 6, 1891, and writes as follows: "The nest was placed about 5 feet from the ground, in the center of thick brush, and was difficult to reach. It was found on a brush-covered ridge, cut up by ravines, covered with oak, lemonberry, manzanita, juniper, yucca, prickly pear, mescal, and other growths which contribute to the appearance of a northern Arizona landscape, about 100 feet above a small valley through which flowed a rivulet. The parents remained in the vicinity, screaming harshly, bounding through the juniper trees, and trying for a long while to draw me away. When I finally located the nest, finding further deception useless, the one which I took to be the female disappeared; the other then perched within 10 feet of me and peered at me silently, with his head cocked on one side, an interested spectator of further proceedings. As we watched each other so closely I could not forbear saying, 'Ah, yes, my fine fellow, you are right; we are a pair of robbers. How many birds' nests have you robbed this morning and devoured the young, too?' When I had secured the nest and packed the eggs away, he flew off with loud screams, no doubt intended for Jay-like anathemas, which I could but feel were well merited."

The nests are placed in scrub oaks, piñons, and thick shrubbery, usually but a short distance from the ground and not far from water. The nest taken by Captain Carpenter, which is before me, is composed of a slight platform of very crooked interlaced twigs, and on these is placed a lining of fine roots and some horsehair. No mud is used in its construction. The lining is about three-fourths of an inch in thickness. Compared with other Jays' nests this is a rather small structure, and not nearly as deep. It measures about 7 inches in outer diameter by 4 inches in depth, and the inner cup 3½ inches in diameter by 2 inches in depth.

In the more southern portions of their range nidification begins in the latter part of March or the first week in April, varying somewhat according to altitude.

[1] The Auk, Vol. IV, 1887, p. 20.

In Colorado most of these birds appear to breed in May, while in northern Arizona well-incubated eggs have been found as late as the first week in June. Incubation lasts about sixteen days, both parents probably assisting; and I think that but one brood is raised in a season. The number of eggs laid to a set varies from three to six, usually four or five. The ground color of these eggs is a dirty pea green or a pale sage green; they are sparingly spotted and flecked over the entire surface with irregular markings of ferruginous brown, tawny, and lavender, these being usually heaviest about the larger end of the egg, but nowhere so abundant as to hide the ground color. The shell is compact, rather smooth, and but slightly glossy. They vary in shape from ovate or short ovate to elongate ovate.

The average measurement of twenty-two eggs in the United States National Museum collection is 27.57 by 20.09 millimetres, or about 1.09 by 0.79 inches. The largest egg measures 29.46 by 20.32 millimetres, or 1.16 by 0.80 inches; the smallest, 25.40 by 19.81 millimetres, or 1 by 0.78 inch.

The type specimen, No. 20359 (Pl. 5, Fig. 14), Bendire collection, from a set of six eggs, was taken by Mr. Charles E. Aiken, in El Paso County, Colorado, on May 18, 1874, and represents an average marked egg of this species.

## 147. Aphelocoma californica (Vigors).

CALIFORNIA JAY.

*Garrulus californicus* Vigors, Zoology Beechey's Voyage, 1839, 21, Pl. V.
*A[phelocoma] californica* Cabanis, Museum Heineanum, I, October 15, 1851, 221.
(B 437, C 236*b*, R 293, C 356, U 481.)

Geographical range: Pacific Coast regions; from northern Lower California north through California (excepting southeastern parts), western Oregon, to southwestern Washington; east to and including the eastern slopes of the Sierra Nevada, in California and western Nevada, and the eastern slopes of the Cascade Mountains, in Oregon.

The California Jay is a common resident in suitable localities throughout the greater portion of its range, its favorite haunts being the oak-covered foothill regions of the higher mountains, the brush-covered sides of the canyons leading into these, and the shrubbery along water courses. It avoids the extensive pine forests, and is rarely met with in such localities, excepting along their borders. In summer it has been found at altitudes of from 6,000 to 8,000 feet, but it is much more common in the lower agricultural districts and the oak belt. Where these trees are abundant the California Jay is sure to be also present.

Mr. A. W. Anthony found it common in the vicinity of Ensenada, in Lower California, which marks about the southern limit of its habitat. Its eastern range terminates along the eastern slopes of the Sierra Nevadas, where it is only found in isolated localities, and it was not observed in any of the desert ranges to the east of these mountains by Dr. Merriam's exploring parties. Mr. Robert Ridgway reports it as quite common in the vicinity of Carson City, Nevada.

Mr. H. W. Henshaw met with it a considerable distance north of this point, and I shot a male and saw several pairs on May 10, 1883, thirty miles south of Fort Klamath, Oregon, on the road to Linkville, on a hillside covered with mountain mahogany bushes, where they were evidently breeding. This locality is east of Klamath Lake and the Cascade Mountains. Mr. Henshaw reports a specimen taken at The Dalles, October 4, 1879, and Mr. R. H. Lawrence considers it common at Ridgefield and Vancouver, Washington, as is also the White-fronted Jay. He writes from Portland, Oregon, under date of October 19, 1892: "Eight California Jays seen, mostly in small trees at the roadside and on the ground. This species frequents the bushy strips bordering fences and the edges of fields and sloughs in the Columbia River bottom. Judging from the numbers seen at Ridgefield and the surroundings this species chooses, I should expect to find it well up in the valley of the Cowlitz River, Washington." Mr. Lawrence adds: "The call notes of the California Jay bear much resemblance to those of *Cyanocitta stelleri frontalis*, but they are not so loud and strong. One of their calls sounds like 'hi-e' or 'hee-hee, hee-hee;' another, not so harsh nor so loud, is 'whé, whé, whé.'"

Mr. Charles A. Allen, of Nicasio, California, writes: "I consider their calls fully as harsh and rasping as those of any other member of this family. One of their notes of alarm, uttered when they see something they do not like, especially an Owl asleep in a tree, sounds like 'cŭr, cŭr, cŭr;' as soon as this is heard by others in the vicinity they will commence to gather and join in the chorus. A sort of social note of recognition sounds like 'whŭze, whŭze,' given while moving about among the trees and shrubbery, and one of their common call notes sounds like 'creak, creak.'

"No bird is more destructive of the smaller species building open, unconcealed nests than this Jay. I have seen one alight on a limb near a nest, eat the eggs that it contained, and, not satisfied with this, give the nest a down and inward stroke with its bill, ripping it open. They are especially destructive to the nests of the Black-chinned and Anna's Hummingbirds and the Ground Tit. They also become altogether too familiar about the poultry houses, and will eat the eggs as fast as the hens lay them. As soon as they hear a hen cackle after laying, three or four of these birds go to the spot at once. Even the chicken house affords no protection against these robbers, if they can find a way of entering it; shooting is equally ineffectual, for they are too numerous. They destroy vast quantities of fruit in apple, peach, pear, and plum orchards, as well as many smaller fruits. Shooting them by hundreds and hanging their carcasses in the fruit trees as scarecrows is of no avail; they do not know enough to be frightened at anything. I have tried to poison them, but never saw a dead one except when shot. They also destroy a great deal of young wheat when first sown, until it is 2 or 3 inches high. They pull it out of the ground and eat the soft, swelled grains; after the stalks begin to grow they will not molest it. I have never seen one Jay eat another's eggs, but they possibly may do so on rare occasions. One not familiar with these birds can not realize the amount of mischief they can do, and they are increasing in numbers from year to year."

I have received similar testimony from other correspondents in California, and there seems to be no doubt that the California Jay is one of the greatest nuisances wherever it is abundant, which seems to be the case throughout the greater portion of the State, and no one has anything good to say of it. In its general habits it resembles the Blue Jay considerably; it is an equally good mimic, but it is less shy and wary and far more familiar and impertinent. Its flight is slow and laborious, accomplished by considerable flapping of the wings, and only resorted to for short distances and through necessity. On the ground and in bushes it is quick and agile in all its movements, hopping about from limb to limb, and darting through the thickest undergrowth with great ease. It is omnivorous, and away from the settlements its food consists principally of acorns, the seeds of the nut pine, insects of various kinds, wild fruits, and berries.

Mr. R. H. Beck, of Berryessa, California, writes me that he has seen them with lizards in their claws. In the winter they mostly congregate in the shrubbery found along the creek bottoms, and among the oak groves in the lower foothills, leaving the more isolated localities in the mountain gorges where many of them spend the summers. In southern California nidification commences occasionally in the beginning of April, and correspondingly later northward, where it is generally at its height during the first two weeks in May. I think it not improbable that in favorable localities two broods are occasionally raised in a season. Mr. F. Stephens took a set of four eggs near Owen's Lake, Inyo County, California, in which incubation had just commenced, as late as June 8, 1891, and in a locality where these birds were not likely to have been previously disturbed.

The nests are usually found on brush-covered hillsides or in creek bottoms, placed in low bushes and thickets, such as blackberry, poison oak, wild gooseberry, currant, hazel, hawthorn, and scrub-oak bushes, or in osage-orange hedges; occasionally in a small piñon pine or a bushy young fir, and quite frequently on a horizontal limb of an oak, varying in height from 3 to 30 feet from the ground. In the majority of cases the nests are located near water, but sometimes one may be found fully a mile distant. Externally they are composed of a platform of interlaced twigs, mixed occasionally with moss, wheat stubble, and dry grass; on this the nest proper is placed, which consists of a lining of fine roots, sometimes mixed with horsehair. No mud enters into the composition of their nests. One now before me, taken by Mr. F. Stephens, as mentioned above, measures 9 inches in outer diameter by $3\frac{1}{2}$ inches in height; the inner cup is 4 inches in diameter by 2 inches deep. Outwardly it is composed of small twigs of sagebrush, and the lining consists entirely of fine roots; it is compactly built and well constructed. The nests are usually well concealed, and the birds are close sitters, sometimes remaining on the nests until almost touched.

The number of eggs to a set varies from three to six, sets of four or five being most common; the male assists in the construction of the nest, and to some extent in incubation, which lasts about sixteen days. The young are able to leave the nest in about eighteen days, and follow the parents for some time.

Late in the summer they congregate in straggling flocks in localities where they find subsistence most abundant, as near orchards and among the oak groves in the foothills, which at that time supply them with the bulk of their food; here they are constantly at war with the Californian Woodpeckers, whom they try to rob of their carefully hoarded winter stores whenever an opportunity presents itself, while in the winter they come around the farmhouses and steal whatever eatables they can.

The ground color of the egg of the California Jay is very variable, ranging from deep sea green to pea and sage green, and again to dull olive and vinaceous buff. The eggs with a greenish ground color usually have markings of a dark bottle-green tint, mixed sometimes with different shades of sage green. The eggs having a buffy ground color are spotted, blotched, and speckled with different shades of ferruginous, cinnamon, rufous, and occasionally lavender. The markings are generally scattered over the entire surface of the egg, and are usually heavier about the larger end, but nowhere so profuse as to hide the ground color. These markings vary considerably in size; some are irregular in shape, others are quite even in size throughout, and occasionally they are fine and profuse, resembling in style of markings the well-known eggs of some of the Thrashers (*Harporhynchus*). A few instances are known where unspotted eggs have been found. The shell is close grained and lusterless. In shape the eggs are mostly ovate; a few are elongate ovate.

The average measurement of seventy-six eggs in the United States National Museum collection is 27.82 by 20.62 millimetres, or about 1.10 by 0.81 inches. The largest egg of the series measures 30.78 by 21.84 millimetres, or 1.21 by 0.86 inches; the smallest, 24.89 by 19.30 millimetres, or 0.98 by 0.76 inch.

The type specimens figured are selected to show some of the different styles of coloration found among the eggs of this species, which are subject to a great deal of variation. No. 20369 (Pl. 5, Fig. 15), Bendire collection, taken near Nicasio, Marin County, California, April 31, 1878, represents one of the rarer color phases; No. 20846 (Pl. 5, Fig. 16), presented by Dr. James C. Merrill, United States Army, from a set of three eggs taken near Santa Cruz, California, April 23, 1877, shows another rather rare style of coloration; No. 24331 (Pl. 5, Fig. 17), received from the United States Department of Agriculture, from a set of four eggs, taken by Mr. F. Stephens, near Owen's Lake, Inyo County, California, on June 8, 1891, shows one of the commoner types; and No. 26950 (Pl. 5, Fig. 18), from an incomplete set of two eggs, taken by Mr. J. Van Denburgh, near Los Gatos, California, on May 16, 1889, shows a rather light-colored and nearly immaculate specimen.

## 148. Aphelocoma californica hypoleuca Ridgway.

XANTUS'S JAY.

*Aphelocoma californica hypoleuca* Ridgway, Manual of North American Birds, 1887, 356. (B 437, part; C 236*b*, part; R 293, part; C 356, part; U 481*a*.)

Geographical range: Southern Lower California; north to about latitude 28°.

Very little is yet known about the life history of Xantus's Jay (a somewhat smaller bird than the preceding), which inhabits the southern half of the California Peninsula. Mr. Xantus, in whose honor this subspecies is named, found it a common resident in the vicinity of Cape St. Lucas, and states that its habits are much the same as those of the California Jay. They were also met with by Mr. L. Belding in the same region. Mr. Walter E. Bryant states: "I saw a few among the mangroves of Magdalena Island, and along the mangrove-bordered *estero* to San Jorge, and northward as far as latitude 28°." Regarding its nesting habits, he says: "A single nest of this new variety was found by myself a few miles southward of San Ignacio, on April 12, 1889. The nest was built about 3 metres high, in a green acacia, near the trail. The female was sitting and did not fly until preparations for climbing the tree had commenced. The nest was in quite an exposed situation, among scant twigs on a horizontal branch. It is composed of small, loosely laid dry twigs, and is a shallow receptacle, lined with fiber and horsehair. The eggs, three in number (set No. 899, collection of W. E. Bryant), contained small embryos. They are more finely spotted than some similar Jays' eggs, with shell spots of pale lilac gray and surface spots of pale olive green. The ground color is dull glaucous green. They measure 27.5 by 20.5, 27.5 by 21, and 27 by 21 millimetres"[1] (or about 1.08 by 0.79, 1.08 by 0.83, and 1.06 by 0.83 inches).

I have been unable to learn anything further about the general habits of this subspecies; they are undoubtedly very similar to those of the California Jay.

Two eggs in the United States National Museum collection, taken by Mr. Xantus in the vicinity of Cape St. Lucas, in the spring of 1860, have a pale bluish-green ground color and are spotted over the entire surface with small markings of grayish brown, which are slightly heavier about the larger end of the egg. The eggs are ovate in shape and slightly glossy, and are evidently out of different nests. One measures 28.70 by 21.34 millimetres, or 1.13 by 0.84 inches; the other, 24.13 by 17.78 millimetres, or 0.95 by 0.70 inch.

The type specimen, No. 5174 (not figured), in the United States National Museum collection, was taken as above stated, and closely resembles an average egg of the California Jay.

[1] Proceedings of the California Academy of Sciences, 2d series, Vol. II, 1889, pp. 24 and 293.

## 149. Aphelocoma californica obscura Anthony.

BELDING'S JAY.

*Aphelocoma californica obscura* Anthony, Proceedings California Academy of Sciences, 2d series, II, October 11, 1889, 75.
(B —, C —, R —, C —, U 481*b*.)

Geographical range: San Pedro Martir Mountains, Lower California.

Belding's Jay, another subspecies of the California Jay, was recently described by Mr. A. W. Anthony, in the "Proceedings of the California Academy of Sciences" (2d series, Vol. II, October 11, 1889, pp. 73, 75). The type, which differs from *Aphelocoma californica* in its much darker colors and weaker feet, was obtained by him at Valladores, Lower California September 8, 1888. In describing the region where his specimens were collected, he says: "About 150 miles south of the United States boundary, and midway between the Pacific Ocean and the Gulf of California, lies a high range of mountains which is marked upon the later maps of the peninsula as 'San Pedro Martir.' The region embraces a series of small ranges which rise from an elevated mesa having a mean elevation of about 8,000 feet and an extent of 60 by 20 miles. In these mountains are born the only streams that this part of the peninsula affords, and an abundance of pine timber is found throughout the region. Many of the ranges on the eastern side of the San Pedro Martir rise to an elevation of 11,000 feet, or even in one or two places to 12,500 (?) feet.

"Rising as the region does from the dry, barren hills of the lower country to an elevation higher than any other on the peninsula or in southern California, and presenting in its alpine vegetation and clear mountain streams features so different from the dry manzanita and sage-covered hills of the surrounding country, it is not unnatural to suppose that its animal life would be found to differ in some respects from that of the surrounding hills, etc."

In these regions Belding's Jay is found, and it is to be hoped that Mr. Anthony will be able to pay another visit to these mountains and explore them more thoroughly. Nothing is yet known regarding the nesting habits and eggs of this well-marked subspecies.

## 150. Aphelocoma insularis Henshaw.

SANTA CRUZ JAY.

*Aphelocoma insularis* Henshaw, Auk, III, October, 1886, 452.
(B —, C —, R —, C —, U 481.1.)

Geographical range: Santa Cruz Island, southern California.

The Santa Cruz Jay, which seems to be confined to the similarly named island, one of the innermost of the Santa Barbara group, about 23 miles distant from the California coast, was first discovered by Mr. H. W. Henshaw, in June,

1875, and described by him in "The Auk" (Vol. III, 1886, pp. 452, 453). It is a larger bird than the California Jay, and generally deeper colored. Very little is yet known about the life history of this species.

Mr. Eli Whitney Blake, jr., who visited this island on two occasions in 1887, states: "It is by far the commonest land bird of the island, and familiar to the verge of impudence. General habits like those of its near relatives on the mainland. Several nests which must have belonged to this species were placed in trees or bushes, between 6 and 30 feet from the ground. They exhibited no marked peculiarity of construction."[1]

The eggs of this species, as far as I am aware, remain still to be described. There is probably but little difference between them and those of the California Jay.

## 151. Aphelocoma sieberii arizonæ Ridgway.

ARIZONA JAY.

*Cyanocitta ultramarina* var. *arizonæ* Ridgway, Bulletin Essex Institute, V, December, 1873, 199.

*Aphelocoma sieberii arizonæ* Ridgway, Proceedings U. S. National Museum, VIII, 1885, 355.

(B 440, C 237, R 295, C 357, U 482.)

Geographical range: Southern New Mexico and Arizona; south into Sonora and Chihuahua, Mexico.

The Arizona Jay is a common resident throughout the oak belt of southern Arizona and New Mexico which generally fringes the foothills of the mountains and ranges well up among the pines. In suitable localities these Jays are very abundant, especially so along the slopes of the Santa Catalina, Huachuca, Santa Rita, and Chiricahua mountains, in southern Arizona, and the ranges adjacent to the Rio Mimbres, in southern New Mexico. They are rarely seen any distance out on the arid plains; but after the breeding season is over small flocks are sometimes met with among the shrubbery of the few water courses, several miles away from their regular habitat. I repeatedly noticed several of these Jays along the Rillito Creek, near my camp, in 1872–'73, in the early spring and up to the middle of May, evidently on a raid after eggs and the young of smaller birds, which breed in abundance here among the undergrowth in the creek bottoms. On such occasions they were very silent, and their presence was only betrayed by the scoldings they received from the numerous resident bird population. On their own heath they are as noisy as any of our Jays, and apparently far more sociable, a number of pairs frequently breeding in a small oak grove in close proximity to each other, in this respect resembling the Piñon Jay, which also breeds in colonies at times. They do not unite in as large flocks, however, but move about more in small family parties, from half a dozen to

[1] The Auk, Vol. IV, 1887, p. 329.

twenty or thirty, in fact it is rare to see one alone. They are exceedingly restless, constantly on the move, prying into this or that, spending a good portion of their time on the ground, now hopping on a low limb, and the next minute down again, twitching their tails almost constantly. Their call notes are harsh and far-reaching, and are somewhat similar to those of the California Jay. They are as great robbers of the eggs and young of smaller birds as the former. The other birds inhabiting the same surroundings and building open nests must certainly have a hard time of it in rearing their young.

Their food consists of grasshoppers and insects of various kinds, animal matter when obtainable, wild fruits, seeds, and especially acorns. The latter probably form the bulk of their subsistence throughout the greater portion of the year. In the Suharita Pass, between the Santa Catalina and the Rincon mountains, near Tucson, Arizona, I noticed about twenty feeding on the fig-like fruit of the suahara, of which, like many other birds, they seemed to be very fond. Their flight appears to me to be far less laborious than that of the California Jay. It reminds me of that of some of our Raptores, rising now high in the air, partly closing their wings, and then darting suddenly down, then up again, and repeating these movements for some time. In southern Arizona the mating season begins about the end of February, and nidification follows soon after.

According to observations made by Mr. W. E. D. Scott, the Arizona Jay sometimes does not commence laying until fully two weeks after the nest has been completed, and again builds an additional nest close to the first, without occupying it. A nest is described by him as follows: "It was built in an oak sapling, about 10 feet from the ground, and is composed of dry rootlets laid very loosely in concentric rings, and with little or no attempt at weaving together. There is nothing like a lining, and the walls of the structure have an average thickness of about three-quarters of an inch. The interior diameter is 5 inches, and the greatest interior depth is $1\frac{3}{4}$ inches. The whole fabric recalls to mind a rather deep saucer. The nest was not built in a crotch, but where several small branches and twigs leave the large branch ($1\frac{1}{2}$ inches in diameter) which forms the main support. All the other nests I have seen resemble this one so closely that this description will answer for them."[1]

A nest of this species, taken by Lieut. H. C. Benson, United States Army, on April 6, 1887, differs somewhat from those described by Mr. Scott. It is composed outwardly of small sticks and twigs; next comes a layer of fine rootlets, well woven together—this mass is alone over half an inch in thickness—and, finally, the inner nest is lined with a liberal supply of horsehair. It is well constructed, and measures about 10 inches across externally by 4 inches in depth; the inner diameter is about $4\frac{1}{2}$ by 2 inches in depth.

The nest and eggs of the Arizona Jay were first discovered by Mr. F. Stephens, near Fort Bayard, New Mexico, on April 29, 1876, and since then he has found it breeding in the Chiricahua and Santa Rita mountains; he considers it a foothill bird, not going far into the pines and not appearing on the plains.

[1] The Auk, Vol. III, 1886, p. 81.

Lieutenant Benson, United States Army, found them breeding abundantly in the vicinity of Fort Huachuca, Arizona, during April and May, 1887. All of the nests taken by him, some thirty in number, were placed in oaks, from 12 to 30 feet from the ground, usually about 15 feet high, being generally only moderately concealed. His first set was found on April 6, and the majority were taken in this month; his latest record is May 10. The breeding season seems to be at its height during the latter half of April. But one brood appears to be raised in a season, and incubation lasts about sixteen days. The number of eggs to a set varies from four to seven; sets of four eggs are more frequently found than larger ones, and in thirty-four sets now before me there is only one of six and one of seven eggs. These differ from all the known eggs of this family found within the United States by being unspotted. They are glaucous green in color, and the majority are much more glossy than Jays' eggs generally are.

In the fine series of specimens, one hundred and thirty-six in number, nearly all collected by Lieutenant Benson, I can not find a single one that shows any trace of markings; they are all perfectly immaculate. The shell is smooth and compact; in shape they vary from ovate to elongate ovate.

The average measurement of this series is 30.28 by 22.26 millimetres, or about 1.19 by 0.88 inches. The largest egg measures 35.05 by 22.10 millimetres, or 1.38 by 0.87 inches; the smallest 26.92 by 21.59 millimetres, or 1.06 by 0.85 inches.

The type specimens, Nos. 22969 and 22997 (Pl. 5, Figs. 19 and 20), from sets of four and five eggs, respectively, were collected by Lieut. H. C. Benson, Fourth Cavalry, United States Army, near Fort Huachuca, Arizona, on April 15, and 27, 1887, and represent average types of this species.

## 152. Aphelocoma cyanotis Ridgway.

BLUE-EARED JAY.

*Aphelocoma cyanotis* Ridgway, Manual of North American Birds, 1887, 357.
(B —, C —, R —, C —, U 480.1.)

Geographical range: Eastern Mexico, from the States of Puebla, Mexico, and San Luis Potosi north to western Texas.

The Blue-eared Jay, a recent addition to our fauna, was first described by Mr. Robert Ridgway from a specimen now in the United States National Museum collection, taken by Mr. John Taylor, in September, 1836, in Mexico (exact locality not known), and it was only rediscovered a few years ago by the late Mr. P. L. Jouy, near Charcas, Puebla, Mexico, which remains as yet the most southern point of its known range. Since then the United States Department of Agriculture has received a number of specimens from different localities in the States of Mexico and San Luis Potosi, where it appears to be common, and also three from Paisano, Brewster County, Texas, a station on the Southern

Pacific Railroad, and the highest point (5,082 feet) on this road.[1] These specimens were taken on July 14, 18, and 21, 1890, and it is probable that this species breeds there. The mountain slopes here, forming a southern extension of the Guadalupe range, are covered in places with scrub oak and juniper groves, and these form the home of this Jay.

Dr. A. K. Fisher, in his note in "The Auk" already mentioned, referring to these Texas specimens, says: "Through the kindness of Mr. Ridgway they were compared with the type of *Aphelocoma cyanotis* in the United States National Museum collection, and were found to be referable to that species. They differ from *cyanotis* in averaging a little smaller, and in having a more slender bill, thus grading toward *woodhousei*, as might be expected, where the range of that bird is approached. In coloration, however, allowing for the slight difference due in the wearing of the plumage, they are identical with *cyanotis*, and in no way resemble *woodhousei*."

Its nests and eggs still remain unknown, as far as I am aware, but they are not likely to differ very much from those of the other members of this genus. The mountains and hilly regions of that part of Texas where this Jay is found have been but very indifferently explored, and undoubtedly other species new to our fauna will be found here when this section becomes better known from an ornithological standpoint.[2]

## 153. Xanthoura luxuosa (Lesson).

GREEN JAY.

*Garrulus luxuosus* Lesson, Revue Zoologique, 1839, 100.
*Xanthoura luxuosa* Bonaparte, Conspectus Avium, I, 1850, 380.
(B 442, C 238, R 296, C 358, U 483.)

Geographical range: Lower Rio Grande Valley, in Texas; south through eastern Mexico to Vera Cruz and Puebla.

The range of the Green or Rio Grande Jay is a very restricted one in the United States, including only the lower Rio Grande Valley, northwest to about Rio Grande City, Texas.

Mr. D. B. Burrows, writing me from Roma, Texas, says: "These birds are common a few miles below Rio Grande City, but are never seen above this place."

[1] The Auk, Vol. XI, p. 327.

[2] Since this was written Mr. H. P. Attwater, of San Antonio, Texas, to whom I am indebted for a great deal of valuable information relating to Texas birds, has kindly sent me a skin of a Jay, a female, shot near the head waters of the Nueces River, in Edwards County, Texas, on December 1, 1894, which, on careful comparison with a fair series of skins of the Blue-eared Jay now in the U. S. National Museum, as well as in the collection of birds in the U. S. Department of Agriculture, does not appear to me to be referable to this species, although it resembles it rather closely. I am inclined to believe that on the whole it comes nearer to *Aphelocoma sumichrasti* Ridgway, and may prove to be a new race of this species. In the meantime I have received some additional material, consisting of an adult male and 3 adult females, as well as a young female, only a few days from the nest. One of the adults was taken on March 18, the remaining ones on May 8, 1895. Mr. Attwater obtained these species near the source of Johnson Creek, about 20 miles northwest of Kerrville, Kerr County, Texas, where this species is not uncommon and breeds. Although these skins are in rather worn plumage and in poor condition, they appear to be referable to this species instead of *Aphelocoma sumichrasti*, as was at first surmised. This extends its range somewhat farther eastward.

The "Pajaro verde," as this bird is called by the Spanish-speaking population of this region, is a common resident throughout the heavier-timbered river bottoms and the chaparral bordering the Rio Grande, especially in the vicinity of Hidalgo and Lomita, and breeds wherever found.

Dr. James C. Merrill, United States Army, in speaking of this species, says: "The Rio Grande Jay is a common resident about Fort Brown and higher up the river, but does not seem to pass much into the interior of Texas. It is a noisy and gaudy species, soon making its presence known by its harsh cries or by its green and yellow plumage, seen for a moment as it moves about. Though at times shy, it is often very tame and bold, entering tents and taking food off of plates or from the kitchen, whenever a good opportunity offers. Large numbers are caught by the soldiers in traps baited with corn, but the plumage is their only attraction as a cage bird."[1]

There is little or no difference in the general habits of the Green Jay from those of the other members of this family.

Mr. George B. Sennett says: "Of all the birds on the lower Rio Grande, this is the most mischievous, robbing and despoiling other birds' nests without mercy."[2]

Very little has as yet been recorded regarding the food of this Jay, excepting what I have already mentioned, but it is presumable that it does not vary much from that of our better-known species. The nesting season commences early in April and lasts through May. The first nest and eggs brought to the attention of naturalists, as far as I am aware, are those taken by Dr. Merrill on May 27, 1876, near Edinburg (now Hidalgo), Texas, about 70 miles above Fort Brown, on the Rio Grande, and recorded in the "Bulletin of the Nuttall Ornithological Club, 1876" (Vol. I, p. 89). This is described as follows: "It was placed on the horizontal branch of a waican tree, about 25 feet from the ground, and was built of twigs and rootlets. The cavity was slight, and the entire structure so thin that the eggs could be seen through the bottom. They were three in number and quite fresh."

Two nests now in the United States National Museum collection resemble the above, and are frailer than any other Jays' nests I have ever seen. They do not always build such slight structures, however. Mr. Sennett describes one as follows: "The nest of the Jay was some 9 feet from the ground, on the outer branches of a small tree, and composed wholly of sticks and fine twigs. The sticks were so full of thorns that when they were crossed about among the living branches more firmness was given to the nest than usual, and by cutting off the branches I could readily take it entire. The outside diameter is 9 inches one way by 8 the other; its depth is 4 inches; inside it is 3½ inches wide by 2 inches deep."[3]

The nests are generally placed in dense thickets and well hidden among the branches at heights varying usually from 5 to 10 feet from the ground, and

[1] Proceedings of the U. S. National Museum, Vol. I, 1878, p. 136.
[2] Bulletin of the U. S. Geological Survey, 1879, Vol. V, No. 3, p. 400.
[3] U. S. Geological Survey, 1878. Vol. IV, No. 1, p. 30.

rarely in large trees. They are frequently found in retama, anacahuita, brasil, and hackberry bushes or trees. The outer nest consists usually of a slight platform of small thorny twigs and branches, sparingly lined with fine rootlets, small pieces of a wire-like vine, bits of moss, and occasionally dry grass and leaves. The Green Jay apparently does not use mud in the construction of its nest. The earliest breeding record I have is April 3, and the latest is May 26. The breeding season is at its height during the last week in April and the first week in May. It is probable that two broods are sometimes raised in a season. The length of incubation is not likely to vary more than a day or so from that of our better-known Jays.

The number of eggs laid by this species is from three to five; sets of four are most often found. The prevailing ground color of these eggs is grayish white, occasionally pale greenish white or buff color. They are profusely spotted and blotched—but never heavily enough to hide the ground color—with different shades of brown, gray, and lavender; these markings are generally more abundant about the larger end of the egg. The shell is close grained, moderately strong, and shows little or no gloss. Their shape is mostly ovate, and sometimes short ovate.

The average measurement of seventy eggs in the United States National Museum collection is 27.31 by 20.43 millimetres, or about 1.08 by 0.80 inches. The largest egg of the series measures 30.78 by 21.84 millimetres, or 1.21 by 0.86 inches; the smallest, 24.89 by 19.30 millimetres, or 0.98 by 0.76 inch.

The type specimen, No. 20843 (Pl. 3, Fig. 15), from a set of four eggs, was taken by Dr. James C. Merrill, United States Army, near Fort Brown, Texas, on April 23, 1877, and represents one of the commoner types. Nos. 26359 and 26362 (Pl. 3, Figs. 16 and 17), Ralph collection, both from sets of four, taken near Brownsville, Texas, on April 3 and May 9, 1893, respectively, show different and less common styles of marking.

## 154. Perisoreus canadensis Linnæus.

CANADA JAY.

*Corvus canadensis* Linnæus, Systema Naturæ, ed. 12, I, 1766, 158.
*Perisoreus canadensis* Bonaparte, Geographical and Comparative List, 1838, 27.
(B 443, C 239, R 297, C 359, U 484.)

Geographical range: From northern New England, northern New York, northern Michigan, and Minnesota, northward through the Dominion of Canada to Hudson Bay and the interior of British North America, east of the Rocky Mountains; casually south to northern Massachusetts (Berkshire County).

The Canada Jay is locally known as "Whisky Jack" and "Whisky John," a corruption of its Indian name, "Wiss-ka-chon" or "Wis-ka-tjon;" it is also sometimes called "Moose Bird," "Hudson Bay Bird," "Caribou Bird," "Meat Bird," "Grease Bird," "Camp Robber," and "Venison Hawk," by the guides and lumbermen of the Adirondack wilderness; it is only found in the more northern

parts of the United States, where it is a resident and breeds. Within our borders it is most common in northern Maine and northern Minnesota, inhabiting the extensive pine and tamarack forests found there. In the Adirondacks, in northern New York, it occurs only in the wilder portions, and it is not uncommon in sections of the White and Green Mountains, in northern New Hampshire and Vermont. It occasionally straggles a little farther south than the points mentioned, but such occurrences are rather rare. Northward it ranges through the Dominion of Canada to the western shores of Hudson Bay, to Fort Churchill, and thence throughout the interior of the fur countries to the limit of timber within the Arctic Circle, east of the Rocky Mountains.

No bird is better known to the lumbermen, trappers, and hunters along our northern border than the Canada Jay, which is a constant attendant at their camps, and affords them no little amusement during the lonely hours spent in the woods. To one not familiar with these birds it is astonishing how tame they become.

Mr. Manly Hardy writes: "The Canada Jay is a constant resident of northern Maine, but in some seasons they are far more abundant than in others, being usually found in companies of from three to ten. They are the boldest of all our birds, except the Chickadee (*Parus atricapillus*), and in cool impudence far surpass all others. They will enter tents, and often alight on the bow of a canoe where the paddle at every stroke comes within 18 inches of them. I know of nothing which can be eaten that they will not take, and I had one steal all my candles, pulling them out endwise one by one from a piece of birch bark they were rolled in, and another pecked a large hole in a cake of castile soap. A duck which I had picked and laid down for a few minutes had the entire breast eaten out by one or more of these birds. I have seen one alight in the middle of my canoe and peck away at the carcass of a beaver I had skinned. They often spoil deer saddles by pecking into them near the kidneys. They do great damage to the trappers by stealing the bait from traps set for martens and minks and by eating trapped game; they will spoil a marten in a short time. They will sit quietly and see you build a log trap and bait it, and then, almost before your back is turned, you hear their hateful 'ca-ca-ca' as they glide down and peer into it. They will work steadily carrying off meat and hiding it. I have thrown out pieces and watched one to see how much he would carry off. He flew across a wide stream and in a short time looked as bloody as a butcher from carrying large pieces; but his patience held out longer than mine. I think one would work as long as Mark Twain's California Jay did trying to fill a miner's cabin with acorns through a knot hole in the roof. They eat insects of different kinds, and I have found carrion beetles in their crops; they also eat the fungi or mushrooms growing on stumps, using these largely when other food is scarce. They are fond of the berries of the mountain ash, and, in fact, few things come amiss; and I believe they do not possess a single good quality excepting industry. They breed early in March. While on a trip to the famous Ripogenus Falls, in June, 1891, I saw many young Canada Jays; these were

slate black, about the color of a Catbird, and my guide informed me that he saw the young flying about as early as April 10."

A correspondent of "The American Field" (in Vol. 34, July 19, 1890, p. 54), under the nom de plume of "Agamak," writes about the Canada Jay as follows: "He will eat anything from soap to plug tobacco. His appetite and capacity to stow away food is beyond belief. One day we had a dozen large salmon trout hung up to dry, but being absent from camp for a few hours we returned to find four Whisky Jacks had totally annihilated our fish. They would fly off with pieces half as large as themselves and in a few minutes return for more. It is not possible they could have eaten it all. I have fed them small bits till they could hardly fly enough to get in a tree. Our pork, soap, tobacco, and other provisions were unsafe in their sight and reach. Our Indians used to say: 'Him eat moccasins, fur cap, matches, anytink.' I once snared two of them and put them in a cage made of birch bark and tamarack roots. Half an hour after their capture they would eat greedily from my hand. He is well named 'Whisky Jack,' as I never saw a more insane, drunken-acting creature in my life."

The apparent absence of all fear of man, its extreme familiarity, and the many cunning and amusing traits of our Canada Jay must certainly commend him to any lover of nature and go far toward balancing accounts for the damage he sometimes does through theft, while his absence from the silent pine, fir, and spruce forests and tamarack swamps in which he makes his home would certainly be felt, and by none more than the hardy trapper or hunter, whose only companion he is on many lonely tramps through the deep winter snows, where for days at a time not another living creature is seen.

Mr. E. A. Samuels, in his Birds of New England (p. 367), says: "I have had numerous opportunities for observing its habits, and I can positively affirm that it is equally rapacious and destructive with the Blue Jay, which it resembles in motions and cry. I once knew of a single pair of the birds destroying the young in four nests of the common Snowbird (*Junco hyemalis*) in a single day."

Its flight is slow and laborious, and only accomplished with a great deal of flapping of the wings, while it moves on the ground and in trees with an expertness equal to that of our better-known Blue Jay. It utters a number of peculiar notes and sounds which are utterly impossible of reproduction on paper.

The nesting season begins early, long before the snow has disappeared, and therefore comparatively little is yet known about its breeding habits.

Mr. R. MacFarlane found several nests and eggs of the Canada Jay near Anderson River Fort, British North America, during the first week in May, and reports them tolerably numerous in the wooded country, even to its northern and eastern limits; but none were observed by him in the barrens west or east of Horton River, nor on the Arctic coast. The nests found by him were placed in spruce or tamarack trees, often in the middle of a swamp, on branches, close to the trunks, and well concealed from view, and at heights of 9 or 10 feet.

The Canada Jay, like the other members of this family, is silent and retiring during the breeding season, and is then seldom seen or heard. In the

more southern portion of its range nidification begins in March, and somewhat later farther north. The nest is a bulky affair. One now before me, sent by Mr. MacFarlane, and collected near the Hudson Bay Post, at Pelican Narrows, in latitude 50° 30′, contained four eggs when taken, in March, 1891. It was placed in a small spruce tree, near the trunk, about 9 feet from the ground. It is composed of small twigs, plant fibers, willow bark, and quite a mass of the down and catkins of the cottonwood or aspen, this material constituting fully one-half of the nest. The inner cup is lined with finer material of the same kind, and Jays' feathers, which are easily recognized by their fluffy appearance. The nest is about 8 inches wide by 4 inches deep; the inner cavity being about 3 inches in width by $2\frac{1}{2}$ inches in depth. A nest taken near Ashland, Aroostook County, Maine, is composed externally of bits of rotten wood, mixed with tree moss, plant fibers, and catkins, and is lined with similar but finer materials. This is a symmetrical, well-built structure, much neater than the former, and measures 7 inches in outer diameter by 4 inches deep; the cavity is 3 inches wide by 2 inches deep.

The number of eggs laid, as far as known to me, is three or four, although sets of five may sometimes be found. Their ground color is generally pale gray, more rarely pearl gray. They are profusely flecked and spotted over the entire surface with different shades of brown, slate gray, and lavender. Their shape is ovate; the shell is smooth, close grained, and somewhat glossy.

The average measurement of eighteen eggs in the United States National Museum collection is 29.38 by 20.91 millimetres, or about 1.16 by 0.82 inches. The largest egg measures 30.78 by 22.35 millimetres, or 1.21 by 0.88 inches; the smallest, 26.42 by 20.32 millimetres, or 1.04 by 0.80 inches.

The type specimens, Nos. 20376 and 20377 (Pl. 3, Figs. 18 and 19), both from sets of four eggs, Bendire collection, were taken in Colchester County, Nova Scotia, on April 2 and 4, 1884, and represent the different styles of markings found among the eggs of this species in the collection, as well as the variation in size.

## 155. Perisoreus canadensis capitalis Baird.

ROCKY MOUNTAIN JAY.

*Perisoreus canadensis* var. *capitalis* "Baird MS.," Ridgway, Bulletin Essex Institute, V, Nov., 1873, 193.

(B —, C 239*b*, R 297*a*, C 362, U. 484*a*.)

Geographical range: Rocky Mountain regions of the United States, from New Mexico and Arizona north into British North America; west to eastern Oregon and Idaho.

The Rocky Mountain or White-headed Jay is a common resident of all the higher ranges of the Rocky Mountain system in the United States, and occurs also in the White Mountains of Arizona, which form about the southern limit of

its range. It passes north into British North America and apparently beyond, but how far in that direction has not yet been determined. It is moderately common in suitable localities in Colorado, Wyoming, and Montana.

I first met with the Rocky Mountain Jay on October 31, 1875, while on a hunting trip, on the head waters of Bear Creek, a tributary of Silvies River, in the Blue Mountains, in Grant County, Oregon, at an altitude of about 6,500 feet. It appeared to be rather rare, only two specimens being observed. These were attracted by a deer which I had killed, and were feeding on the offal. I shot one of the birds, which is now in the United States National Museum collection. I believe this point marks about the western limits of its range, the somewhat smaller Oregon Jay being also found in the same mountains, not more than 10 miles west of this locality. I also saw a few of these birds in the Bitter Root Mountains, as well as in the Yellowstone National Park, in 1877, but had no opportunity then to observe them closely. Their general habits appear to be very similar to those of the Canada Jay. Dr. James C. Merrill, United States Army, met with it near Fort Sherman, Idaho, where it appears to be a somewhat irregular visitor within a few miles of this Pass.

Mr. Frank M. Drew, in his paper on the Birds of San Juan County, Colorado, in the "Nuttall Ornithological Club Bulletin" (Vol. VI, 1881, p. 140), speaking of this bird says: "Quite abundant, in summer ranging from 10,000 feet altitude to timber line. In autumn, when on his first tour of inspection around the house, he hops along in a curious sidelong manner, just like a schoolgirl in a slow hurry. White-headed, grave, and sedate, he seems a very paragon of propriety, and if you appear to be a suitable personage, he will be apt to give you a bit of advice. Becoming confidential, he sputters out a lot of nonsense in a manner which causes you to think him a veritable 'Whisky Jack;' yet, whenever he is disposed, a more bland, mind-his-own-business-appearing bird will be hard to find, as will also be many small articles around camp after one of his visits, for his whimsical brain has a great fancy for anything which may be valuable to you, but perfectly useless to him."

Very little is yet known about the nests and eggs of the Rocky Mountain Jay, and they are unrepresented in the United States National Museum collection. The late Dr. T. M. Brewer received both from Mr. Edwin Carter, of Breckenridge, Colorado, and describes them as follows:

"On April 2, 1879, Mr. Carter found the nest of the Rocky Mountain Jay near Breckenridge, Colorado, at an altitude of about 10,000 feet. The nest was placed on a horizontal branch of a pine tree, 3 feet from the trunk and 40 feet from the ground. It contained three eggs, apparently its full complement, which were slightly incubated. The nest, which is now before me as I write, is warmly, strongly, and compactly interwoven of various materials, of which the feathers and down of various kinds of birds constitute the characteristic ingredient. The nest measures 4 inches in external height and 7 in diameter. The cavity is 2 inches deep and 4 in diameter at the top. The external framework of the nest is a rude but strong interweaving of twigs and small

branches of pine, inclosing a closely impacted inner nest, composed of strongly blended materials, stems of grasses, hempen fibers of plants, bark, down, feathers, etc. The walls of the nest are 2 inches thick, and the inner nest is warm and soft.

"The measurements of the eggs before me are 1.19 by 0.86, 1.16 by 0.86, and 1.10 by 0.86 inches, (or 30.22 by 21.84, 29.46 by 21.84, and 27.94 by 21.84 millimetres). Their ground color is a grayish white. In two the markings are all grouped around the larger end, the residue of the surface being nearly unmarked. In one the markings are well distributed over the entire egg, but larger and confluent at the rounded end. The markings are larger, more confluent, and not so distinct and separate as in the eggs of *Perisoreus canadensis*, and are of a distinct shade of brown. While there is an absence of slate and lilac, and while the markings are all of one color, there is a tinge of purple shading them all, and the blotches vary greatly, in the depth and intensity of the shading, from very light to a very deep color. The parent accompanying the nest and eggs is a female."[1]

These eggs are now in the museum at Cambridge, Massachusetts, where I have had the opportunity of examining them. As as they do not materially differ from those of the preceding species, and as they are in a poor state of preservation, I have not figured any.

## 156. Perisoreus canadensis fumifrons Ridgway.

ALASKAN JAY.

*Perisoreus canadensis fumifrons* Ridgway, Proceedings U. S. National Museum, III, March 27, 1880, 5.

(B —, C —, R 297*b*, C 360, U 484*b*.)

Geographical range: Alaska, excepting the southern coast districts.

This subspecies is a resident and breeds wherever found. According to Mr. L. M. Turner, the Alaskan or Smoky-fronted Jay is known as the "Sójah" to the Russian-speaking element of Alaska; he writes: "It rarely occurs in the vicinity of St. Michaels. Two specimens were obtained at the Redoubt during my three and a half years' stay there. Along the Yukon River it is abundant and a permanent resident. The most of my specimens were obtained from Fort Yukon, Nulato, and Anvick, on the Yukon River."[2]

Mr. E. W. Nelson, in speaking of the geographical range of the Alaskan Jay, says: "Many specimens from the Upper Yukon are nearly typical *Perisoreus canadensis*, but the present form gradually replaced it lower down this stream until, near Nulato to the coast, birds approaching the *canadensis* style are almost unknown. The present form is the only *Perisoreus* found throughout the Sitkan and Kadiak region, thence north along the region bordering the Bering Sea coast, and up the wooded interior.

[1] Bulletin of the Nuttall Ornithological Club, Vol. IV, 1879, pp. 239, 240.
[2] Contributions to the Natural History of Alaska, No. II, 1886, p. 167.

"Two nests were brought me from the mouth of the Tanana River by Mr. François Mercier, who obtained them April 1, 1880, after considerable persuasion and an offer of a large reward in flour to the natives during a time of scarcity. By these means he succeeded in getting a native to search for the nests of this bird. The young fellow returned in a few hours with two nests, each containing half-grown young. Walking into the house, he told the trader to take the nests and birds at once, for he was sure some evil would result from his act, and taking his flour he hurried away before the birds and nests were examined. All the old crones and men of the vicinity prophesied that the weather would turn cold and that a very late spring would ensue as a result of this robbery. As chance would have it, the prophecies of the old soothsayers came true in a remarkable degree, and the spring was the coldest and most backward, by nearly a month, of any year since the Americans have had possession of the country. In the following spring (of 1881) I asked the same trader to try and get eggs of this bird by sending out natives earlier in the season. He complied, and offered still greater rewards than on the first occasion, but the natives could not be bribed to risk the visitation of the birds' anger, and the old people positively forbade any of the younger ones to have anything to do with the matter; therefore the attempt was abandoned. One point was gained, however, and that was the information how the natives found the nests so readily. They told the trader that these nests could always be easily found by examining the snow at the base of each bushy-topped spruce, and whenever a number of small dry twigs were found lying near together upon the snow under a tree there was a great probability of a Jay's nest being snugly esconced in the thick branches overhead.

"The two nests, now before me, are built of a matted mass of a cotton-like down of some plant; about the upper edge and in the cavity are pieces of rabbit fur, a few Horned Owl feathers, and fine strips of bark. The entire nest rests upon a horizontal branch nearly 2 inches in diameter, and a scanty number of small dead spruce twigs, 6 to 8 inches long, loosely woven into the structure, give it consistency and prevent it from being easily damaged. This nest is $4\frac{1}{2}$ inches high by 6 broad, with a cavity $2\frac{1}{2}$ inches deep by $3\frac{3}{4}$ inches across the top. The other nest was placed in the fork of a small branch less than half an inch in diameter, and rests on a rough platform of slender spruce twigs. The main part of the nest is made of the same cottony substance as is the first, and is also interwoven with twigs. Above this is a layer of fine, fibrous black moss, such as occurs on spruce trees. The inside of the cavity is slightly lined with fine grass. This nest measures 4 inches high by 6 inches broad, and the cavity 2 inches deep by $2\frac{3}{4}$ inches across the top."[1]

Mr. W. H. Dall, of the United States Coast Survey, also took a nest of this Jay near Nulato, with four half-grown young, on April 20, showing that these birds usually nest in March, notwithstanding the intense cold which occurs occasionally at this time of the year.

The eggs of this subspecies, as far as I am aware, still remain unknown, but they are not likely to differ much from those of the Canada Jay.

[1] Report upon Natural History Collections made in Alaska, No. III, 1887, p. 165.

## 157. Perisoreus canadensis nigricapillus Ridgway.

LABRADOR JAY.

*Perisoreus canadensis nigricapillus* Ridgway, Proceedings U. S. National Museum, V, 1882, 15.

(B —, C —, R —, C —, U 484*c*.)

Geographical range: Coast regions of Labrador and the timbered portions of the interior; north to Hudson Strait.

The Labrador Jay is a resident and breeds wherever found. For all the knowledge we possess of the life history of this Jay we are principally indebted to Mr. L. M. Turner, from whose copious manuscript notes on the "Birds of Labrador and Ungava" I extract the most interesting portions:

"This Jay is an abundant resident throughout the entire region wherever timber is to be found. I observed the bird at Rigolet, Davis Inlet, Georges River, Whale River, Fort Chimo, and far in the interior. At certain seasons it is more plentiful than at other times; after August it is very abundant until the next May, and is then very scarce until the following September. Over one hundred and thirty specimens were preserved, and among this number are birds of nearly every month of the year. The breeding season could not be determined with exactness, as it varies according to the exigencies of the weather. An adult female procured April 9, 1883, contained ova of various sizes, the larger ones measuring, respectively, 0.50, 0.44, and 0.33 inch in diameter; the largest ovum was apparently ready to descend into the oviduct. * * * The Indians assert that April is the month in which the Jays breed, and that only one brood is reared each year. Young birds as large and actually heavier than adults were obtained, fully feathered, from June 18 to 29. From May to September these Jays are almost silent; not a sound will be heard in patches of wood frequented by them, and as they certainly attempt to conceal themselves during this period, it is extremely difficult to obtain specimens, for they sit so quietly among the thick moss and branches of the trees that detection is only rarely possible. In October they assume their winter plumage and become livelier, uttering frequent whistles which sound exactly like those made by one boy who hails another; in fact, I have often mistaken the sound for that of a person whistling to attract my attention. Their power of mimicry is also good; the notes of the American Rough-legged Hawk, for instance, are well imitated, as are also the clucking sounds of the Catbird when it enters a thicket.

"During the winter time these birds obtain a scanty supply of food, and during excessively severe periods they frequently are so reduced that a specimen will no more than equal the weight of a Redpoll (*Acanthis linaria*). They are omnivorous; nothing comes amiss. I obtained a specimen which had the dried bracts of a spruce cone in its beak. This mass was quite large and covered with a viscid saliva. Inspection proved that this substance contained no larvæ which could have tempted the bird to swallow the mass through inability to tear

it apart. They are persistent visitors to the tents of camping parties, and they appear to have the faculty of discriminating between the tents of natives, who (the Indians more especially than the Eskimo) wage war on every Whisky Jack that comes in sight.

"I was once encamped a few miles above the rapids, some 35 miles from Fort Chimo, and thought to take a nap while the other members of the party watched for caribou to cross the river. My attention was directed to a noise within the tent, and I perceived a Whisky Jack perched on a pile of meat. I carefully arose, and although the bird was within 2 yards of me it fearlessly continued to peck at the fatty portions exposed. I then went to the meat and cut off small portions and fed the bird from my hand, and in less than five minutes it was resting on one hand and feeding from the other. I was surprised at its familiarity, and continued to feed it until it could swallow no more. I then cut off a large piece, placed it in the beak of the bird, and drove it outside, when it flew to a neighboring tree, so heavily freighted that it could scarcely sustain flight.

"The Indians will not be tempted to procure the eggs of this bird under any circumstances. They believe that if a person sees the eggs in the nest, and especially if he counts them, some great misfortune will befall him. Repeated inquiry among them elicited the statement that they had never seen the eggs and knew nothing about the number laid.

"Its general habits are similar to those of the other members of this family. It is one of the greatest nuisances the trappers have to contend against, and one of these assured me that he had taken fifteen of these birds from a line of less than forty traps in a single day, and with good reason he called this bird a 'wolverine with feathers on.'

"I have never found the Labrador Jays in flocks, although several may be in the neighborhood, and on a single occasion only I saw five perched in one tree. If a gun be fired it is certain to cause a Jay to investigate it, and I think experience has taught him that food may be procured at such times."

Since the above was written I have been fortunate enough to examine a set of these eggs, taken in Labrador, in about latitude 57° 30′ N. Mr. Jewell D. Sornborger, of Cambridge, Massachusetts, while on a visit to that region in the summer of 1892, obtained a set of five, and generously presented three of these through the writer to the United States National Museum collection, and subsequently also deposited the remaining two. They resemble the eggs of *Perisoreus canadensis* in color and in the general style of markings, but the latter are, as a rule, coarser and larger, and the eggs are more pointed. Three eggs in this set may be called pointed ovate in shape; the other two approach an ovate pyriform. They measure 30.22 by 21.08, 29.97 by 21.34, 29.97 by 21.34, 29.72 by 21.08, and 29.21 by 21.59 millimetres, or 1.19 by 0.83, 1.18 by 0.84, 1.18 by 0.84, 1.17 by 0.83, and 1.15 by 0.85 inches.

The type specimen, No. 26560 (Pl. 3, Fig. 20), represents an average-colored egg of this subspecies.

## 158. Perisoreus obscurus (Ridgway).

OREGON JAY.

*Perisoreus canadensis* var. *obscurus* Ridgway, Bulletin Essex Institute, November, 1873, 194.
*Perisoreus obscurus* Sharpe, British Museum Catalogue of Birds, III, 1877, 105.
(B —, C 239*a*, R 298, C 361, U 485.)

Geographical range: From the higher mountainous regions of northern California north through Oregon and Washington into British Columbia.

The Oregon Jay, better known throughout its range as "Meat Hawk," "Camp Robber," and "Venison Bird," is a constant resident of the higher mountains of northern California, Oregon, Washington, and a considerable portion of British Columbia, and breeds wherever found. I met with it first on the summit of the Blue Mountains, between Canyon City and Camp Harney, Oregon, on June 12, 1877, at an altitude of about 6,500 feet. I was escorting an army paymaster, and after a laborious climb to the top of the steep mountain at the foot of which nestles the little mining town from which we started, I stopped for luncheon and to rest the animals. While so engaged I heard several whistles in a large pine close by, and these were answered from other directions. Shortly after I saw one of these birds in a little fir a few feet from where I was sitting at lunch. I threw him some scraps of bread and meat, and he was by no means slow in accepting the invitation to help himself. A few minutes later three others made their appearance and fed among our party with the utmost unconcern, and almost allowed themselves to be touched. Here they are found only in the highest portions of the mountains, which attain an altitude of about 7,000 feet. I did not see any in the neighborhood of Camp Harney.

While changing station from Fort Walla Walla, Washington, to Fort Klamath, Oregon, on June 12, 1882, I met a brood of young birds, accompanied by both parents, in a grove of small pines near the banks of the Des Chutes River, Oregon, which had evidently left their nest only a day or two previously, and my men caught two alive. They were of a dark slate-black color, quite unlike the adults. A few miles north of Fort Klamath, on the Crater Lake Mountain, they were very common and I had no difficulty in obtaining all the specimens I wanted. While some of their notes are not as melodious as they might be, the majority are certainly quite pleasing to the ear, and I consider this species a very fair songster. I have listened to them frequently, and have been surprised to find so much musical ability. Like the other members of the genus *Perisoreus*, the Oregon Jay is a great thief and nothing edible comes amiss; its general habits also are similar. It is a slightly smaller and darker colored bird than the Canada Jay.

Mr. A. W. Anthony found this species a common winter resident in Washington County, Oregon, and says: "'Fearless' is an appropriate term to use in relation to this bird; it seems utterly devoid of fear. While dressing deer in the thick timber I have been almost covered with Jays flying down from the neigh-

boring trees. They would settle on my back, head, or shoulders, tugging and pulling at each loose shred of my coat until one would think that their only object was to help me in all ways possible. At such times their only note is a low, plaintive cry."[1]

The nests and eggs of the Oregon Jay were first discovered by Mr. Anthony, and he has generously given both, as well as other equally rare specimens, to the United States National Museum. He writes as follows relative to the finding of the nest: "The birds were discovered building on March 4, 1885; one of them was seen clinging to the side of a dead stub, about 75 feet from the ground. He was tearing out bits of moss, which did not seem to suit, for they were dropped again as fast as gathered; but at last, finding some to his fancy, he flew off and I saw him go into a thick fir and disappear. I could as yet see nothing of a nest, but as both birds were flying in with sticks, moss, etc., I was sure one was being built there. Both birds worked hard, were very silent, and did not come very near the ground, getting nearly all of their building material from the tree tops, I think. On the 16th I again visited the place, and with the aid of a field glass discovered the nest, which was to all appearances complete, but the birds were not seen. On the 21st I took a boy with me to climb the tree, and found the nest finished, but no eggs. On March 31 we visited it again and found the set complete and the female at home. She stayed on the eggs until the climber put his hand out for her, when she darted off with a low cry and was shot by me. The eggs, five in number, were but slightly incubated; the nest was placed about 85 feet from the ground and 10 feet from the top of the tree; it was built close to the trunk, and was very well hidden."

This nest, now before me, is compactly built and rather symmetrical, measuring 7½ inches in outer diameter by 4½ inches deep; the inner diameter is 3 inches by 2½ inches deep. Externally it is composed of fine twigs, dry grass, tree moss, and plant fibers, all well interlaced, and the inner cup is composed exclusively of fine, dark-looking tree moss.

The number of eggs to a set varies from four to five. Incubation begins sometimes as early as the latter part of March, and again as late as the first week in May.

Mr. C. W. Swallow writes me that he took a set of four eggs of this species in Clatsop County, Oregon, on May 8. This nest was placed in a small hemlock, about 10 feet from the ground. I believe as a rule they nest in high, bushy firs. I saw a pair of these birds evidently feeding young, in a very large fir tree, near the summit of the Cascade Mountains, on June 9, 1883, while en route from Linkville to Jacksonville, Oregon, but could not see the nest, which must have been fully 60 feet from the ground. But one brood is reared in a season. The eggs are pearl gray or light greenish gray in ground color, spotted and flecked with smoke and lavender gray, and these markings are pretty evenly distributed over the entire egg. In shape they are ovate; the shell is smooth, close grained, and only moderately glossy.

[1] The Auk, Vol. III, 1886, p. 167.

They measure 26.67 by 20.07, 26.67 by 20.07, 26.67 by 19.81, 26.42 by 20.07, and 25.40 by 20.32 millimetres, or 1.05 by 0.79, 1.05 by 0.79, 1.05 by 0.78, 1.04 by 0.79, and 1 by 0.80 inches.

The type specimen, No. 22449 (Pl. 3, Fig. 21), from a set of five eggs, was taken by Mr. A. W. Anthony, near Beaverton, Oregon, on March 31, 1885, and represents an average egg of the set.

## 159. Corvus corax sinuatus (Wagler).

AMERICAN RAVEN.

*Corvus sinuatus* Wagler, Isis, 1829, 748.
*Corvus corax sinuatus* Ridgway, Proceedings U. S. National Museum, VIII, 1885, 355.
(B 423, 424, C 226, R 280, C 338, U 486.)

Geographical range: From British Columbia, the southern parts of the Dominion of Canada and the United States, mostly west of the Mississippi Valley, south through Mexico to Guatemala. Local and much rarer in the eastern United States; principally in mountainous regions; south to northern South Carolina, northern Georgia, and northern Alabama.

Our Ravens have recently been separated into two races; but from the information I have been able to obtain it is questionable if the alleged differences of the two forms will prove constant and marked enough to warrant this distinction. There is not at present sufficient material available for examination to determine this conclusively. I will leave this to abler ornithologists to decide, and will follow the adopted nomenclature of the American Ornithologists' Union for the present, including, however, the Ravens found in the eastern United States in this race.

The American Raven is more generally distributed throughout the western parts of the United States than in the eastern portions of its range, where it is only found locally, and principally in the more mountainous regions from New England and northern New York to northern South Carolina, and in the thinly inhabited and heavily timbered sections of some of our Northern and Middle States. It seems to make little difference to these birds how desolate the country which they inhabit may be, as long as it furnishes sufficient food to sustain life, and they are not hard to please in such matters. One is liable to meet with them singly or in pairs, and occasionally in considerable numbers, along the cliffs of the seashore, and on the adjacent islands of the Pacific coast, from Washington south to Lower California, as well as in the mountains and arid plains of the interior, even in the hottest and most barren wastes of the Colorado Desert, as the Death Valley region, and through all the States and Territories west of the Rocky Mountains. In the eastern parts of its range it is most commonly found among the numerous islands off the coast of Maine, in the Adirondack wilderness in northern New York, and especially in the extensive mountain regions of North Carolina, where it appears to be as common as in many localities in the West.

The American Raven is usually a resident wherever found, but is likely to wander considerable distances in winter, congregating in localities where food is most easily obtained. While as a rule, it is nowhere abundant, it is generally distributed over a large area, and in certain localities it may be called fairly common. I have met with them at every Post at which I have been stationed in the West, but nowhere so abundantly as at Camp Harney, Oregon, where I had excellent opportunities to observe them.

They are stately and rather sedate-looking birds, remain mated through life, and are seemingly very much attached to each other, but apparently more unsocial to others of their kind. On the ground their movements are deliberate and dignified; their walk is graceful and seldom varied with hurried hops or jumps. They appear to still better advantage on the wing, especially in winter and early spring, when pairs may be frequently seen playing with each other, performing extraordinary feats in the air, such as somersaults, trying to fly on their backs, etc. At this season they seem to enjoy life most and give vent to their usually not very exuberant spirits by a series of low chuckling and gurgling notes, evidently indifferent efforts at singing.

Their ordinary call note is a loud "craack-craak," varied sometimes by a deep, grunting "koerr-koerr," and again by a clucking, a sort of self-satisfied sound, difficult to reproduce on paper; in fact, they utter a variety of notes when at ease and undisturbed, among others a metallic-sounding "klunk," which seems to cost them considerable effort. In places where they are not molested they become reasonably tame, and I have seen Ravens occasionally alight in my yard and feed among the chickens, a thing I have never seen Crows do. Their larger size when compared with the latter bird is not so noticeable while on the wing, but on the ground, when feeding among its smaller relatives, it is very perceptible.

Although a good deal has been written reflecting on the Raven, my personal observations compel me to consider it as a rather orderly member of a somewhat disreputable family group. Among various misdeeds it is charged with killing young lambs, chickens, and turkeys, as well as with destroying the eggs and young of different species of wild fowl; and while this is true to some extent, yet where these birds can get a reasonable amount of food from other sources they rarely disturb domestic animals of any sort. I have more than once seen a Raven feeding among my poultry, apparently on friendly terms with both young and old; they never molested any to my knowledge; nor have I ever heard complaints of shepherds that their lambs were troubled, much less killed, by them. Their food consists principally of carrion, dead fish, and frogs, varied with insects of different kinds, including grasshoppers and the large black crickets so abundant at some seasons in the West; they also eat worms, mussels, snails, small rodents, including young rabbits, as well as refuse from the kitchen and slaughterhouse. While the American Raven appears to be a well-behaved bird in some localities, this is by no means the case everywhere. Mr. Charles A. Allen, writing me on this subject from Nicasio, California, says: "In the

interior of California the Raven destroys many young chickens and turkeys around the ranches. In the spring months I have frequently seen one of these birds flying overhead with a young fowl or an egg in its bill. While making off with one of the latter this is very noticeable, as the egg shows off so plainly against the shiny black of its plumage. Inland it nests in the highest redwood or fir trees, and nearly always in such as are practically inaccessible to the average collector, and on the seacoast on the face of the highest cliffs, where they prey on the eggs and young of the Gulls and Cormorants nesting there."

In the winter it was no unusual sight at Camp Harney, Oregon, to see a dozen or more Ravens and perhaps twice as many Crows searching through the fresh piles of manure which were daily carted out of the cavalry stables and dumped some distance below the Post.

The Raven is usually one of the shyest and most suspicious of birds, one of the most difficult to bring to bag, and here only have I been able to approach them at all closely; in other localities where I have observed them they remained very shy and cautious, as is their usual custom.

Camp Harney is situated on the southern slope of the Blue Mountains of Oregon, attaining here a height of between 6,000 and 7,000 feet, the foothills and canyons leading into them abounding in perpendicular cliffs varying from 30 to 50 feet in height, and furnishing many excellent nesting sites for these birds, at least six pairs breeding regularly within a radius of 3 miles and perhaps a dozen more within 8 miles of the Post. Notwithstanding their comparative abundance, I rarely managed to obtain more than three full sets of eggs in a season during the four years I was stationed there; this may have been due to their extraordinary cunning and the irregularity of their nesting, which undoubtedly in some cases was done purposely. Should a pair of these birds realize that their nest had been discovered, although finished and ready to receive the eggs, they will abandon it, sometimes for several weeks, and apparently leave the locality, only to return and begin housekeeping when presumably all chance of further disturbance has passed. I have lost more than one set of eggs in this way. In one case a pair of these birds, whose nesting site was in plain view from my window, not over 500 yards distant (the nest itself, however, could not be seen), deceived me so completely that their young were half grown before I even discovered that this particular site was again occupied, the parent birds keeping, so far as noticed, entirely out of sight during the day, probably feeding the young only early in the morning and possibly during the night, and I only discovered them by accident while passing along near the top of the cliff very early one morning, being attracted by the cawing of the young.

Out of some twenty nests examined only one was placed in a tree. It was in a good-sized dead willow, 20 feet from the ground, on an island in Sylvies River, Oregon, and easily reached; it contained five fresh eggs on April 13, 1875. The other nests were placed on cliffs, and, with few exceptions, in positions where they were comparatively secure. Usually the nest could not be seen from above, and it generally took several assistants and strong ropes to get near them, and

even then it was frequently impossible to reach the eggs without the aid of a long pole with a dipper attached to the end. A favorite site was a cliff with a southern exposure, where the nest was completely covered from above by a projecting rock. The nests found here were well constructed, and varied considerably in bulk, an average one measuring externally about 18 inches in width by 10 inches in depth. A mass of well-interlaced sticks, some of these very large, formed the groundwork; the sides were lined with and built up of somewhat finer material, and the inner cup of the nest, resembling in size and depth a large soup plate, was thickly quilted with a mass of cattle hair and sometimes the dry, fine inner bark of cottonwood. This inner lining was frequently an inch thick, and made a warm, cosy home for the young. They looked clean, but were offensive in odor, and when the nest was occupied the lining was always alive with fleas. In localities where sheep are abundant the inner lining of the nest consists principally of wool, and in mountainous regions of tree moss.

Nidification, in the vicinity of Camp Harney at least, usually begins in the first or second week in April, sometimes, however, in the latter part of March, and again not before the middle of May. I obtained a perfectly fresh set of five eggs as late as May 29, 1876, from a locality where none of these birds had been disturbed previously; it was apparently a first laying.

The American Raven becomes attached to a site when once chosen, and although its eggs or young may be taken for successive seasons, it will return and use the same nest from year to year. I have taken three sets of eggs (evidently laid by the same bird) from the same nest for successive years; they were readily recognizable by their large size and style of markings. Only one brood is raised in a season. Incubation lasts about three weeks, commencing when the set is completed, and I believe both sexes assist in this labor. When the female is sitting on the nest the male may frequently be seen perched on some small bush or a dead branch of a tree on the opposite side of the canyon from where the nest is situated, uttering an occasional "klunk-klunk" and keeping a sharp lookout. Should anyone approach in that direction, though some distance off, he will warn his mate, uttering a low alarm note while flying past the nest, when she will usually slip off and try to keep out of sight, while he endeavors to draw attention to himself, acting at the same time as utterly unconcerned as if he had no interest whatever in that particular locality.

The young are able to leave the nest about a month after they are hatched, and are cared for by both parents for some time thereafter. They disappeared shortly afterwards from the immediate vicinity of their nesting sites, and spent the summer months about the shores of Malheur Lake, in Harney Valley, where an abundance of suitable food, such as dead fish, could readily be procured.

The number of eggs laid to a set varies from five to seven, sets of five being most common and those of six not rare, while among those taken by me were two sets of seven each. These are deposited on alternate days, but sometimes, after a nest which contained one or two eggs only has been examined, no others may be added for a week or more, and then laying is resumed. The eggs vary in shape

from ovate to elongate and cylindrical ovate; the ground color is usually a pale pea green, less often a drab or greenish olive. They are usually profusely blotched and spotted with different shades of brown, lavender, and drab. In a number of specimens the markings are evenly distributed over the entire egg, in a few cases nearly hiding the ground color; in others they predominate at one of the ends, and an occasional egg is but slightly marked, showing the ground color clearly. One such light-colored egg is often found in sets otherwise heavily marked. The shell is strong and compact and shows little or no gloss. The markings in very rare instances approach the peculiar elongated style so characteristic of the eggs of the White-necked Raven.

The average measurement of fifty-four eggs in the United States National Museum collection, all but two taken by myself, is 49.53 by 32.76 millimetres, or 1.95 by 1.29 inches. The largest egg of the series measures 60.45 by 37.84 millimetres, or 2.38 by 1.49 inches; the smallest, 41.15 by 31.50 millimetres, or 1.62 by 1.24 inches.

The type specimens, Nos. 20321 and 20325 (Pl. 4, Figs. 1 and 2), both from the Bendire collection, were taken by the writer near Camp Harney, Oregon, on April 22, 1876, and April 26, 1877, respectively, the first from a set of seven eggs, the last from a set of six, and these represent the two principal styles of coloration.

## 160. Corvus corax principalis Ridgway.

NORTHERN RAVEN.

*Corvus corax principalis* Ridgway, Manual North American Birds, 1887, 361.
(B 423, part; C 226, part; R 280, part; C 338, part; U 486*a*.)

Geographical range: Northern North America; from Greenland west to Alaska; south to British Columbia, northern Canada, and Labrador.

The Northern Raven is admitted to subspecific rank in our avifauna mainly on the claim of having a relatively larger or stouter bill and a shorter and stouter tarsus than the southern bird, with more of the upper portions of the tarsus concealed by the feathering of the lower parts of the thighs, the plumage generally being less lustrous. Ravens are well known to attain a great age, and instances are on record of these birds having lived over a hundred years; variations in plumage may therefore depend to some extent on age. These differences may possibly prove constant in the far north, to which for the present I prefer to restrict its range.

Its general habits and call notes resemble those of the American Raven; like it, it lives to a great extent on offal and refuse of any kind, and is generally most abundant in the immediate vicinity of Indian camps and settlements, which are mostly located on the seashore, or on the banks of the larger rivers in the interior, where these birds act as scavengers. This is especially the case on the Alaskan Peninsula and on the mainland, where hundreds of these birds may

frequently be seen in the vicinity of the salmon canning stations, where they live almost entirely on the offal of this fish. Clams also form a small portion of their food; these are said to be carried some distance in the air and then dropped on the rocks to break the shells. They also prey to no small extent on the young and the eggs of the different waterfowl which nest in suitable localities in these northern regions in countless numbers. If we could believe all that is told about these birds, they certainly appear to be far more mischievous and impudent than our American Raven. They are said to show an inordinate hatred for the Indian dogs, annoying and teasing them in various ways; for instance, should they find one asleep, they are said to drop a stick or stone upon the unsuspecting animal out of pure mischief.

Mr. B. J. Bretherton, writing me about those birds from Kadiak, Alsaka, says: "I saw a native dog one day with a bone which he vainly endeavored to eat. While so engaged he was espied by a Raven, who flew down and tried to scare the dog by loud cawing, in which he was shortly afterwards assisted by another, both birds sidling up to the dog's head until they were barely out of his reach. Just at this time a third Raven appeared on the scene and surveyed the situation from an adjacent fence, but soon flew down behind the dog and advanced until within reach of his tail, which he seized so roughly that the dog turned for an instant to snap at him, and at the same moment the bone was snatched away by one of the Ravens at his head."

Mr. Chase Littlejohn writes: "In Alaska their nests are usually placed on cliffs, and generally where they can obtain the eggs of other birds with which to feed their young. They are very cunning. I remember a pair which nested on a small island, within a stone's throw of the mainland, on which many Gulls also nested. By acting in concert the latter can defend most of their eggs against these birds, but whenever I visited this island to gather some for food the Ravens took advantage of such an opportunity. They would pick up an egg, carry it to the mainland, hide it carefully in the moss, return for another, and so on until there were no more eggs or until I had left the island, when the Gulls would protect what were left. While the Ravens were on the mainland the Gulls would not molest them, and so they could eat their plunder in peace. All eggs not eaten at once were carefully buried in the moss for future use."

While nesting sites on cliffs are generally resorted to along the seashore, in the interior of Alaska on the Yukon River, as well as on the numerous streams in British North America flowing into the Arctic Ocean, they resort to some extent to trees, probably on account of the absence of the cliffs. Mr. James Lockhart found a nest in a cleft of a poplar tree, 20 feet from the ground, at Fort Yukon, Alaska, on May 29, 1862; and Mr. R. MacFarlane took a set of five eggs from a nest placed near the top of a pine, 45 feet from the ground, near Anderson River Fort, British North America, on April 30, 1864.

Their nests resemble those of the American Raven in construction. Near the seashore they are usually lined with dry grasses, mosses, and seaweed, while hair of the musk ox and moose is often used when procurable in the interior

Nidification begins occasionally in the latter part of April, more generally, however, about the middle of May, and sometimes not until the first week in June. From four to six eggs are usually laid to a set, and only one brood is raised in a season. The eggs do not differ materially from those of the American Raven, but as a rule they are broader, more of a short ovate, and consequently somewhat larger.

The average measurement of thirty-nine eggs in the United States National Museum collection is 49.53 by 34.54 millimetres, or 1.95 by 1.36 inches. The largest egg of the series measures 53.34 by 35.56 millimetres, or 2.10 by 1.40 inches; the smallest, 41.91 by 33.02 millimetres, or 1.65 by 1.30 inches.

The type specimen, No. 18425 (Pl. 4, Fig. 3), from a set of six eggs, was obtained from Governor Fenkel, near Godthaab, Greenland, in 1880, and represents one of the lighter-colored and less heavily marked specimens of the series; the majority resemble the types of the preceding species, and the three eggs figured would answer equally well for both forms.

## 161. Corvus cryptoleucus Couch.

WHITE-NECKED RAVEN.

*Corvus cryptoleucus* Couch, Proceedings Academy Natural Sciences, Philadelphia, April, 1854, 66.

(B 425, C 227, R 281, C 339, U 487.)

Geographical range: Southwestern United States; from southern California southeast through Arizona, New Mexico, and western Texas; south into northern Mexico; north to Oklahoma and western Indian Territory, Colorado, and western Kansas.

The White-necked Raven, a smaller and more slender-looking bird than the American Raven, is likewise a resident and breeds wherever found. Along our southern border these two species are frequently found together, and the marked difference in size between them is then very readily observed. This bird usually inhabits the plains and foothills, and is rarely found at a higher altitude than 5,500 feet. It is far more sociable in its habits than its larger relative, and in winter fair-sized flocks may be often seen together, especially in the vicinity of slaughterhouses. On the whole, they are not as shy as the Ravens, and are much more easily obtained. Quite a number of these birds were constant visitors at my camp at Rillito Creek, near Tucson, Arizona, in 1872 and 1873, on the lookout for scraps of food, and, as they were rarely molested, some of the bolder ones became quite tame.

I remember one bird in particular (easily recognized by a white patch on the throat caused by the loss of some feathers) which visited my kitchen tent regularly, and would pick up food thrown to him, coming frequently within 15 feet of the person throwing it. When the appetite of this bird was satisfied it would still pick up any morsel in sight and hide it in the vicinity, under a piece of bark or any other suitable object. One evening I noticed him hard at work only a

short distance from my tent, evidently digging up something. He pecked away vigorously, and then removed the loosened dirt by scraping with his beak from side to side, forming a kind of trench. I watched him for some time with a field glass, but could not imagine what he was trying to do, so I waited until he had finished, noting the locality carefully. He must have worked nearly half an hour before he flew away. Upon going to the place afterwards, which I thought I could locate at once, I had considerable difficulty in finding it; for everything had been replaced so carefully and naturally that it looked as if the ground had not been disturbed, excepting that a fresh chip of wood was placed on the spot, possibly to mark it. On investigating I found that the bird had made a trench in the hard soil fully 2½ inches deep and about twice as long, in which he had buried a croquette made of canned salmon which the cook had thrown out. I removed this, carefully replaced the soil again as naturally as possible, and marked it with a chip, in the hope of being able to watch the bird when returning for it the next day; but I failed to see him, as he came too early, and, finding the caché robbed, he left in disgust. In its movements the White-necked Raven is not as graceful as the Raven, and its call notes also vary considerably from those of the latter; they are not so loud and penetrating nor so varied. A harsh "kwank, kwank" is most often heard while the bird is on the wing. Their flight is strong and often quite protracted I have sometimes noticed them sailing in circles like Eagles or Hawks, especially in the early spring.

The food of the White-necked Raven consists principally of animal matter, like that of its larger relatives, and, judging from their numbers in certain localities, it seems to find subsistence readily enough in even the most barren regions. This bird is very common in portions of southern Arizona and New Mexico, as well as in western Texas, on the Staked Plains, and fairly so in Starr County, on the lower Rio Grande. Mr. W. E. Grover, of Galveston, writes me that several were shot on the prairie, on the west shore of Galveston Bay, in May, 1890. Some twenty of these birds were feeding among a flock of Red-winged Blackbirds at the time. Although no longer admitted in California lists, this species undoubtedly bred formerly in that State. A set of four eggs, now in the United States National Museum collection, taken by Mr. Xantus de Vesey, near Fort Tejon, California, on May 24, 1858, and entered as those of *Corvus carnivorus*, are unquestionably referable to this species.

Mr. William G. Smith, formerly of Loveland, Colorado, writes that the White-necked Raven breeds in the mountains there, and that he obtained two very young birds of this species, which he reared. One of these remained about the house for over a year, and was often visited by a pair of wild birds, which it would accompany sometimes, and stay away for a day or two, and finally it failed to return from one of these visits.

In suitable localities these birds breed in considerable numbers, for instance, in the vicinity of Fort Huachuca, Arizona, where Lieut. Harry C. Benson, Fourth Cavalry, United States Army, found over sixty of their nests in the season of 1887 and as many as thirteen sets of their eggs in a single day.

I found them rather rare breeders in the vicinity of Tucson, and only secured two of their nests, with eggs, in 1872. In southern Arizona they breed on the dry plains, covered with a scanty growth of mesquite, creosote bushes, yucca, and cactus, often miles from any water, more frequently than among the oaks of the foothills, where I looked principally for their nests. The favorite nesting sites in southern Arizona are low, scrubby mesquite trees, next oak, ash, desert willow, and yucca, and in southern and western Texas ebony and hackberry bushes are likewise not infrequently used for this purpose.

The nests are usually poorly constructed affairs, and are a trifle larger than those of our common Crow. Outwardly they are mainly composed of thorny twigs, while the inner parts are lined with cattle hair, rabbit fur, and frequently with pieces of rabbit skin, wool, dry cottonwood bark, grass, or tree moss, according to locality. This lining is frequently well quilted, and again apparently thrown in loose. They are extremely filthy and smell horribly. Old nests are repaired from year to year, some of them being, as Lieutenant Benson expresses it, seven or eight stories high, showing use for as many years. One of the nests found by me contained a number of rags. The nests are usually placed from 7 to 20 feet from the ground, rarely higher or lower. Considering the warm climate in which these birds are usually found, they nest very late. Out of sixty-six records the earliest is May 6. I took this set, containing only three eggs, in the foothills of the Santa Catalina Mountains, near Tucson, and incubation was about one-third advanced when the eggs were found. Only twelve other sets were recorded for May, and these usually in the latter part of the month. All the remaining sets were taken in June, and fully half of these after the middle of that month. Only one brood is raised in a season. Both sexes assist in incubation, which lasts about twenty-one days; this usually begins only after the set is completed; but young birds varying in size are sometimes found in the same nest. The number of eggs to a set varies from three to eight. In the series of eggs in the United States National Museum collection sets of six and four respectively predominate, and about one set in nine contains seven eggs. Mr. F. H. Fowler, of Fort Bowie, Arizona, writes me that he has found as many as eight eggs in one of their nests. I can only account for the remarkably late nesting of this species by the fact that insects and small reptiles, which probably furnish the larger portion of the food of these birds, are much more abundant in southern Arizona after the rainy season commences, about the last of May, than before, and these birds seemingly understand this and act accordingly.

The eggs of the White-necked Raven are, in nearly every instance, readily distinguishable from those of the other species of the *Corvinæ* found in North America, and this is due to the characteristic style of their markings. The ground color varies from pale green to grayish green, and only very rarely to a light bluish green. Two distinct styles of markings are found among these eggs, the principal but usually not the most notable one consisting of a mass of longitudinal streaks and blotches of different shades of lilac, lavender gray, and drab, running from pole to pole of the egg, and these are again more or less hidden

and partly obliterated by heavier and more regularly defined spots and blotches of different shades of brown. In not a few sets these lighter and more subdued shades are wanting, and are replaced by a more conspicuous brown; but almost all of the eggs show the peculiar longitudinal streaks and hair lines so prominently characteristic of the eggs of the genus *Myiarchus*. Besides the more regularly shaped markings common to the balance of the eggs of our *Corvinæ*, they are on an average also decidedly lighter colored, and a few eggs are almost unspotted. Scarcely any two sets are exactly alike. The shell is strong and compact. In shape they are mostly ovate; a few are elliptical and elongate ovate. They vary considerably in size, and for so large a bird some of the eggs are rather small.

The average measurement of two hundred and eighty-eight eggs in the United States National Museum collection is 44.20 by 30.22 millimetres, or 1.74 by 1.19 inches. The largest egg of the series measures 48.77 by 33.78 millimetres, or 1.92 by 1.33 inches; the smallest, 38.61 by 27.68 millimetres, or 1.52 by 1.09 inches.

The type specimens, No. 23104 (Pl. 4, Figs. 4 and 5), from a set of seven eggs, taken June 4; No. 23124 (Pl. 4, Fig. 6), from a set of four eggs, taken June 18; and No. 23094 (Pl. 4, Fig. 7), also from a set of seven eggs, taken June 17, 1887, were all collected by First Lieut. Harry C. Benson, Fourth Cavalry, United States Army, near Fort Huachuca, Arizona, and represent some of the different styles of markings found among the eggs of this species.

## 162. Corvus americanus Audubon.

AMERICAN CROW.

*Corvus americanus* Audubon, Ornithological Biography, II, 1834, 317.
(B 426, C 228, R 282, C 340, U 488.)

Geographical range: Continent of North America, excepting extreme Arctic regions and Florida in summer; south to northern Mexico.

The American or Common Crow, one of the best-known birds of our avifauna, is widely but somewhat irregularly distributed over a large portion of the North American continent. While somewhat rare in the more northern parts of its range, and possibly entirely absent in certain sections, notably so throughout the greater portion of Labrador and the regions adjoining Hudson Bay, it is nevertheless found in other localities at much higher latitudes, and is known to breed even within the Arctic Circle. Mr. R. MacFarlane obtained two sets of its eggs on the lower Anderson River, in about latitude 68° 35′ N. One set of five eggs was taken on May 5, 1866, and contained large embroys when found, an unusually early breeding record for that region.

In some of our Western States and Territories it is also rare in certain sections, especially so in southern Arizona, where the White-necked Raven replaces this species to a great extent. However, what it lacks in numbers in some localities is

more than made up by its abundance in others, especially in our Eastern States and the Mississippi Valley generally. I have always held that our western Crows constituted a good subspecies and still believe so, but nevertheless follow the nomenclature of the American Ornithologists' Union. While our western birds vary considerably in size, I think comparative measurements of a number of specimens taken from different localities west of the Rocky Mountains will show that they average smaller, and I find the same to be the case with a large series of the eggs. I am also of the opinion that their call notes differ to some extent, but may be mistaken in this. Their plumage is more or less variable, and is less glossy than that of eastern birds, especially during the breeding season. The western Crows, in some sections at least, seem also to be more sociable; at Fort Lapwai, Idaho, for instance, I have occasionally found them breeding in what might be called small colonies, and this was not due to scarcity of timber for nesting purposes; in fact, I once saw here three occupied nests in a single small birch tree, where a number of good-sized cottonwood trees were to be found close by and equally suitable. Such a degree of sociability I have never observed anywhere among the eastern Crows during the nesting season; but it seems also to be unusual in the West, as I noticed it nowhere else.

Some of these western birds are also said to nest occasionally on the ground, a mode of nidification seemingly entirely at variance with the habits of the eastern Crows. Such an instance is recorded by Mr. E. H. Forbush in "Forest and Stream," April 4, 1889, in an article entitled "Five Days a Savage," where he reports finding a crow's nest, containing three young, on the ground on a small barren island in the Gulf of Georgia, British Columbia, which, however, may have been one of *Corvus caurinus*, the Northwest Crow. Again, among a collection of eggs sent to the United States National Museum by Mr. R. MacFarlane, made in the vicinity of Fort St. James, British Columbia, is a set of four unmistakable Crow's eggs, brought in by an Indian for those of Franklin's Grouse, and taken on May 2, 1889, from a nest placed on the ground, under the spreading limbs of a small spruce bush.

In the United States the Crow is a regular resident south of latitude 42°, but not a few winter in suitable localities at points considerably farther north, while on the Pacific Coast they are resident throughout the year. In the late fall all the Crows in a certain section congregate and select some suitable piece of woods, generally at no great distance from some good-sized stream, where they roost in companies, often many thousands in number. From these roosts they scatter regularly every morning over the surrounding country in search of food, undoubtedly covering a radius of many miles in their daily flights, and return again in the evening, in small, scattering bodies, to their regular rendezvous. They may be seen coming in from all points of the compass, the return flight often beginning a couple of hours before the last stragglers arrive. These roosts are probably formed more from sociability than for mutual protection, as the Crow has little to fear from other enemies than man.

Throughout the Eastern States and the Mississippi River Valley generally the Crows are extremely shy and difficult to approach at all times, while in city

parks they seem to know that they will not be shot at, and here one finds them frequently not nearly so cautious. In other sections, especially on the Pacific Coast, where they are not much molested, they are more familiar and comparatively tame, allowing a person to approach them closely, both while feeding on the ground and when perched in trees. Their cunning in evading the farmer's shotgun is only too well known, and many amusing stories are told about these birds in this connection.

Opinions differ greatly as to the economic value of the Crow, and even with the most careful research it can not be accurately determined. While there is no doubt that these birds do considerable damage at times to the growing crops, and especially to Indian corn, and that they destroy the young and eggs of some of our insect-eating birds, on the other hand it is equally certain that they do much good, and it is almost safe to assert that the harm done by them in a general way is pretty nearly, if not fully, compensated for by the good they do in the destruction of numerous noxious insects of all kinds and field mice, as most of their food is obtained on the ground. While I can not enter into details as to their food as fully as these birds perhaps deserve, in justice to them I can say that from examinations made by the United States Department of Agriculture of a large number of stomachs, and covering every month in the year, the results obtained show that at least two-thirds of the food of nestlings consists of animal matter, and that this kind of food also exceeds the vegetable matter consumed by adults during the spring and summer months, while in the late fall and winter the reverse is the case. Indian corn seems to be the staple vegetable food of the Crow in winter, and it is more than probable that a considerable portion of this is of no especial economic value, and is picked up in the field after the crop has been harvested. Wheat, oats, barley, rye, and buckwheat are also eaten by them, but to a much less extent, while acorns, chestnuts, beechnuts, the berries of the poison oak or ivy (*Rhus*), the flowering dogwood (*Cornus florida*), sour gum (*Nyssa*), the cedar, and a number of smaller seeds and different kinds of wild and cultivated fruits also enter into their bill of fare.

During the spring, summer, and fall months insects of all kinds, the seventeen-year locust (*Cicada*), May beetles (*Lachnosterna*), June beetles (*Allorhina*), and especially their larvæ, the well-known white grubs so injurious to all kinds of vegetation, grasshoppers, crickets, cutworms, and angleworms, even carrion-beetles, spiders and their eggs, field mice, snakes, frogs, salamanders, lizards, small turtles, fish, snails, crawfish and other small crustaceans, carrion, and offal generally—in fact, anything washed up by the tides or found along the shores of our larger rivers—constitute the bulk of their food. In the West, where occasionally armies of the large wingless cricket (*Anabes simplex*) and hosts of locusts devour every green blade on their line of march, the Crows destroy enormous numbers of these pests; like them, they seem to be always hungry and able to find room for just one more, and although generally in poor condition throughout the greater part of the year, in such localities they soon wax fat, and they do an immense amount of good, which is rarely taken into consideration, however, by the average farmer, who sees in the Crow an enemy at all times.

Mr. Manly Hardy writes me: "I have often seen Crows, near low tide, dive from a pier, striking the water as a Swallow does, and rise with something shining in their bills. I have seen this many times in Maine, and a friend tells me that he has been near enough to see that they had seized small fish. While waiting for a train I saw one dive in this way and take up some large, white substance; he carried it across the stream and left it on the railroad track; I crossed and found it to be a large bunch of cotton waste; as it was after the time for nesting, he must have mistaken it for food, and finding his mistake abandoned it. Some seasons they destroy quantities of seed potatoes by digging them up soon after planting; they also take new potatoes from the hills, and I have seen them pick beans from the pods at Great Deer Island, Maine. This could not have been for want of food, as an abundance of shellfish could be procured in the vicinity. I have also known a Crow to come into the limits of Bangor, Maine, in a thickly settled neighborhood, and take well-grown robins out of a nest built under the eaves of a house; it would come early in the morning, swooping down like a Hawk, making no noise, taking its victim without alighting. In order to obtain the meat of the great sea snails and whelks along the seashore here, they carry them high into the air and let them fall on the ledges beneath. While in Colorado, in 1891, I saw Crows on the top of Pike's Peak, on October 8, at an altitude of 14,147 feet."

It is well known that Crows are exceedingly intelligent, and quite a variety of their cunning performances have found their way into print, a few of which I mention.

A gentleman from Brighton, New York, under date of September 4, 1882, writes: "The droll antics of a pet Crow, owned by a neighbor, have amused me not a little, and the following exhibition of its intelligence seems deserving of record. A few days since 'Jim' was given some dry crusts of bread for his breakfast. After making several unsuccessful attempts to devour them, he seized one in his beak and hopped upon a chair, then upon the sink, and, finding a basin containing some water, dipped the crust into the water until softened, then removing it, ate it, and jumped down and got the other piece, and, after softening it as before, finished his meal."[1]

Mr. Abbott M. Frazar states: "A tame Crow (*Corvus americanus*) in my possession has repeatedly amused me by the novel method he adopts to rid himself of parasites. For this purpose he deliberately takes his stand upon an ant mound and permits the ants to crawl over him and carry away the troublesome vermin. The operation seems mutually agreeable to all parties, the ants quickly seizing upon the parasites and bearing them away. I have also noticed the same habit in another tame Crow that I formerly had in my possession."[2]

Dr. Ralph tells me that he knew of a case where a pet Crow was teased by letting it peck at a pocketknife and then rapidly withdrawing it. The bird shortly became tired of this, and the next time, instead of trying to catch the

[1] Forest and Stream, September 7, 1882.

[2] Bulletin of the Nuttall Ornithological Club, Vol. I, 1876, p. 76.

knife as before, it bit the person's hand so hard that it caused him to drop the knife, which was quickly picked up by the bird, who then flew away with it. This little incident plainly shows its reasoning powers.

In the mixed woods near Holland Patent, New York, a species of *Helix* is very abundant, and one finds many empty shells from which the animal has been extracted by these birds. Apparently nothing seems to afford more satisfaction to a Crow than to be able to harass every Owl it may see, as well as the larger Hawks, but occasionally it pays rather dearly for such sport.

Mr. J. W. Preston, of Baxter, Iowa, writes me about these birds as follows: "One winter morning, while on my way to a country school, where I was teaching at the time, a Crow was worrying a Red-tailed Hawk, and as it darted at the fleeing bird it made a quick grasp, turning completely over in mid-air, but succeeded in catching the Crow, which it bore down to the ground dead.

"I have seen a Crow carry a piece of meat quite a long distance in its claws. The Crow is terribly destructive to young birds and eggs in the nest. It is painful to see their havoc and hear the pitiful cries of the parent birds. One such occurrence noted was that of a pair of Red-eyed Vireos following close after the Crow, scolding and crying as their nest and young birds were being carried across the field, a choice morsel for young Crows.

"The loss occasioned to farmers from their habit of carrying away eggs is very considerable. I remember a brood of fourteen plump young chicks that were all devoured by the daring fellows. I had allowed them to nest and rear their young in a grove 10 rods from the door, and thus they repaid the kindness. I have seen them feed from the raw back of a live hog which had accidentally been left out of shelter and had been somewhat frozen.

"In a woods near our home was a famous Crow's roost. During the winter of 1891–92 the number was estimated at forty thousand birds. About sunset they came in small flocks and straggling companies from long distances away, gathering into great flocks on pastures and meadows, so thick as to look like plowed land. In the dusk of evening the trees on a whole hillside appeared like a dark bank, so vast was the rookery. We visited this resort often after dark to hear the varied sounds that ever arose from the restless, scolding birds, whose voices were easily heard a mile distant. A whistle or shout was cause for alarm, and the entire flock would rise up like a dark cloud, and the beating of wings sounded like a strong wind. Sometimes they would fly a mile off, and, returning, circle about and begin settling much as Chimney Swallows do, striking each other and the branches with their wings; the din of quarreling for places, changing, and flying up and down was terrible; some cawed loudly, others muffled the tones; some imitated the cry of a child, and some the squawk of a chicken; but the combined effect was a vast, weird wail that reverberated through the forest and died away on the night winds."

In the West I have never seen any very large Crow roosts in winter, although the birds were quite common at Fort Lapwai, Idaho; Camp Harney, Oregon, and in the Walla Walla Valley, Washington, at all seasons. In California they are also common in the larger river bottoms, but on the whole are rather irregularly

distributed, while in southern Arizona and New Mexico they are rare. Mr. F. Stephens writes me that he saw Crows on Big Sandy Creek, 60 miles east of Fort Mojave, Arizona, in February, 1880, and that he shot a specimen on the Mimbres River, southern New Mexico, in April, 1876. I shot a male near Tucson, Arizona, on April 13, 1872, but saw very few others, and failed to find it breeding there.

The longevity of the Crow has been generally admitted, and I had always thought they were extremely hardy; but this seems to be questionable. During January, 1893, large numbers perished in the vicinity of Washington, District of Columbia, from having the cornea frozen during the cold weather occurring about that time, which resulted in blindness and starvation. Mr. Robert Ridgway, of the Smithsonian Institution, showed me a number he had picked up, and assured me that hundreds could be seen laying around in the vicinity, while many others were partly blind.[1]

Dr. M. G. Ellzey, writing from Cumberstone, Maryland, reports the same occurrence in that vicinity, and believes many thousands perished in this manner.[2]

I have only once seen a wild bird partly blind. This was in 1881, while stationed at Fort Walla Walla, Washington. A Western Horned Owl was brought to me alive by one of my men, who, while out hunting, saw it and tried to get within reach to shoot it. It heard him approaching, and in attempting to fly away was stunned by striking a tree. It fell down, and before it recovered he captured it. One of its eyes was in the same condition as those of the Washington Crows, and the other was likewise affected, but it was still able to see a little out of it. The bird was in poor condition, but not near starvation. I kept it for many weeks, and it soon became remarkably tame and gentle, a very unusual thing for birds of this species, and finally I sent it alive to a friend at Johns Hopkins University, Baltimore, Maryland, for examination, and it reached its destination safely.

The only plausible reason I can assign for this affliction of the Crows found by Mr. Ridgway is that while returning from their feeding grounds they were compelled to face an extremely cold and penetrating wind, and having to keep their eyes open to see where they were going, they were frozen. A strange fact was discovered in this connection. Neither Mr. Ridgway nor his companions could discover a single dead Fish Crow among the many specimens examined, although they were well represented among those flying about.

The Crow has a variety of call notes, and is rather noisy at times. The one most frequently heard is a harsh "cawh, cawh," and again a "krah, krah," besides a number of other muffled sounds, generally uttered while at rest at the roost. They are graceful birds on the wing, especially so during the mating season, when pairs, while chasing each other around, may be seen performing all sorts of aerial evolutions, turning complete summersaults, now flying on one

[1] For a fuller account see Science, Feb. 10, 1893.
[2] See Forest and Stream, March 16, 1893.

side, or alternately rising one above the other and suddenly darting down again with wings completely closed, and in the meantime uttering the choicest crow talk to their prospective mates. On the ground they do not appear so prepossessing; their walk is somewhat jerky and uneven, and they do not look nearly as dignified as the Raven. I believe Crows remain mated through life.

Nest building in the more southern States begins sometimes by February 20, and correspondingly later northward. In the vicinity of Washington, District of Columbia, fresh eggs may be occasionally found in the last week in March, but more frequently during the first two weeks in April. Along our northern border they nest generally about the beginning of May; and even in the most northern portions of their range they have been known to breed equally early, but most frequently nidification here is protracted well into June. In Idaho, Washington, and Oregon it is at its height between April 15 and May 20. The nests are bulky, usually well constructed, and placed in the forks of branches, generally well up and hard to reach. Occasionally one is placed near the main trunk, this being mostly the case where bushy cedars or junipers are used. Any sort of tree may be chosen for a nesting site, providing it is one of dense foliage, which will hide the nest well. In some localities pine trees seem to be preferred, while in others oaks are often selected. In the West cottonwoods, junipers, and willows are most frequently used. Nests are usually placed at heights varying from 20 to 60 feet; but I have found some barely 6 feet from the ground, and in many localities in the West they are rarely placed over 20 feet up. Here also they are said to occasionally nest on the ground, but I have never observed this personally. Crows rarely nest in deep forests, the borders of woods and the river bottoms being preferred for such purposes. The nests are composed outwardly of sticks, weed stalks, corn husks, and other coarse material, and lined with grapevine bark, fine roots, dry grass, leaves, straw, moss, rags, wool, and hair, the lining varying in different localities. Where cattle are plenty the nests are often found lined with more or less of their hair. These finer materials are well quilted together. The outer diameter of the nest is usually about 24 inches by 9 inches in depth. The inner cup is from 4 to 6 inches deep and from 12 to 15 inches in diameter. This prevents the eggs from being thrown out of the nest during high winds when placed in slender branches in the extreme tops of trees.

The number of eggs to a set varies from four to eight. Sets of five are most commonly found, while those of seven are rare, and those of eight quite unusual. Mr. A. C. Kempton, Wolfville, Nova Scotia, writes me that he found a set of ten eggs in the spring of 1890, which he believes were laid by the same bird. In the Western States usually from three to five eggs constitute a set, and those of six, according to my observations, are much rarer than in the East. Incubation lasts about eighteen days, and both parents assist in this duty. The young are born blind and naked, and remain in the nest about three weeks. While Crows steal many of the eggs of other birds, they apparently do not molest any of their own kind, but if several pairs nest close together they will

steal nesting material from each other whenever an opportunity occurs. The old nests are resorted to for several seasons in succession where not molested. Only one brood is raised in a season; if the first eggs are taken, they usually lay a second set, but rarely in the same nest. When the young are nearly fledged, they may often be seen sitting on the rim of the nest or on branches close by, watching for the return of the parents with food, and keeping up an incessant clamor.

Crows' eggs are rather handsome, and vary greatly in shape, size, color, and markings; the majority may be called ovate, but both short and rounded ovates, and elliptical and elongated ovates are also found in good series. The ground color varies from malachite and pale bluish green to olive green, and occasionally to an olive buff. The markings usually consist of irregularly shaped blotches and spots of different shades of browns and grays. In some specimens these are large, and irregularly distributed over the egg, usually predominating about the larger end, leaving the ground color clearly visible. In others again the markings are fine, profuse, and evenly distributed, giving the egg a uniform dark olive-green color throughout. In an abnormal set of five eggs, presented by Dr. A. K. Fisher to the United States National Museum collection, four have a pinkish buff ground color, and are minutely speckled with fine dots of ecru drab, resembling somewhat in general appearance a heavily marked egg of the American Coot (*Fulica americana*); the fifth egg has a creamy white ground color, and is spotted with different shades of light brown, drab, and lavender. In another specimen, presented by Dr. Louis B. Bishop, the ground color is salmon buff, and this is blotched with pinkish vinaceous. The entire set of six eggs was similarly colored. Endless varieties may be found in a good series of these eggs. The shell is finely granulated, strong, and occasionally rather lustrous.

The average measurement of two hundred and ninety-two eggs in the United States National Museum collection is 41.40 by 29.13 millimetres, or about 1.63 by 1.15 inches. The largest egg of the series measures 46.74 by 30.78 millimetres, or 1.84 by 1.21 inches; the smallest, 36.07 by 25.91 millimetres, or 1.42 by 1.02 inches.

Of the type specimens, No. 20297 (Pl. 4, Fig. 8), No. 20300 (Pl. 4, Fig. 9), and No. 20303 (Pl. 4, Fig. 10), all from the Bendire collection, were taken by the writer near Fort Lapwai, Idaho, on May 8, 1870, and April 26, and May 4, 1871; No. 20313 (Pl. 4, Fig. 11), also from the above collection, was taken near Camp Harney, Oregon, on May 4, 1877; No. 24922 (Pl. 4, Fig. 12), from the Ralph collection, was taken near Nicasio, California, on April 21, 1883; and No. 23275 (Pl. 5, Figs. 21 and 22), both from the same set, were obtained from Dr. A. K. Fisher, and were collected near Lake George, New York, on May 14, 1883. The specimens figured represent the different styles of coloration found among the eggs of this species, as well as nearly the extremes in size. Plate 4, Figure 10, shows one of the commoner types of markings.

## 163. Corvus americanus floridanus Baird.

FLORIDA CROW.

*Corvus americanus* var. *floridanus* Baird, Birds North America, 1858, 568.
(B 427, C 228*a*, R 282*a*, C 341, U 488*a*.)

Geographical range: Florida.

The Florida Crow is distinguishable from its northern relative by its decidedly larger feet and bill, and its usually shorter wing and tail. It is a constant resident in Florida, and its general habits are similar to those of the American Crow. Dr. Ralph reports it common in the vicinity of San Mateo, Putnam County, Florida, and has sent both birds and eggs to the United States National Museum collection from there. Several nests were found by him in tall, slender pine trees in low, flat pine woods, usually bordering on swamps. The nests were located in the tops of trees, on horizontal limbs, and close to the trunk, at distances varying from 45 to 70 feet from the ground. They are usually composed of small sticks, lined first with Spanish moss and then with strips of cypress bark; occasionally a few feathers from the sitting bird, hair from cows' tails, bunches of fine grass, and grass with the rootlets attached entered into the composition of the linings, and in one instance the eggs were laid on about half a pint of fine rotten wood. The nests average in measurement about 24 by 9 inches in outer diameter, the inner cup being about 16 inches in width by 5 inches in depth.

The eggs vary from three to five in number to a set; they are indistinguishable from those of the American Crow, and are usually deposited in the latter part of February or the first week in March. In a set of five taken by Dr. Ralph, on March 3, 1894, incubation was advanced about two-thirds, while in a set of three taken March 31, 1892, it had just commenced.

The average measurement of twenty eggs of this subspecies in the United States National Museum collection is 41.72 by 29.72 millimetres, or about 1.64 by 1.17 inches. The largest egg measures 45.46 by 29.21 millimetres, or 1.79 by 1.15 inches; the smallest, 38.10 by 29.21 millimetres, or 1.50 by 1.15 inches. In a larger series of these eggs the average measurements would probably be somewhat reduced.

The type specimens, Nos. 24180 and 25590 (Pl. 4, Figs. 13 and 14), both from the Ralph collection, the first from a set of five, the latter from one of three eggs, were collected by Dr. William L. Ralph, near San Mateo, Florida, on March 3, 1891, and March 8, 1892, respectively. They will answer equally well for representations of some of the smaller-sized eggs of the American Crow.

## 164. Corvus caurinus Baird.

NORTHWEST CROW.

*Corvus caurinus* Baird, Birds North America, 1858, 569.
(B 428, C 228*b*, R 282*b*, C 342, U 489.)

Geographical range: Northwestern coast districts; from Oregon north to southern Alaska (Kadiak Island).

From about the mouth of the Columbia River north along the coast of Washington and British Columbia to southern Alaska a small, short-legged, and rather dull-colored Crow is found, which there holds about the same relation to the Common Crow as does the Fish Crow on the Atlantic coast, both species inhabiting the same regions, the Northwest Crow predominating, however. During a visit to the shores of Puget Sound, in May, 1894, I was able to satisfy myself of this fact, and while the somewhat larger Crows of the interior are also found as far west as the Sound, I do not believe that the true Northwest Crow ever passes inland much beyond tide water. Although I observed these birds carefully, I could not detect any very marked difference in their general habits or call notes; if such really exist, they are not nearly so noticeable as are those between the American and Fish Crow on the Atlantic coast. The statement of Mr. J. K. Lord, naturalist of the Boundary Survey between the United States and British Columbia, quoted in Volume II, "History of North American Birds," by Baird, Brewer, and Ridgway (page 251), that "this Crow retired to the interior to breed, and built a domed nest," is entirely erroneous. I have traveled a great deal over the same regions that Mr. Lord did, but my observations do not warrant me in corroborating this statement; none of our Crows build domed nests, but the American Magpie, which is common in the interior of Washington, does, and he mistook their nests for those of the Northwest Crow.

Mr. R. H. Lawrence writes me: "The Northwest Crow is very common in western Washington, and especially abundant on the coast in winter. At South Bend, Pacific County, Washington, in February, 1892, great flocks of this species could be heard when their rendezvous was several miles away on the Willapa River. These flocks had many disputes with the Gulls, large numbers of which remained in and about town. Often the greater portion of both species seemed engaged in these noisy controversies. The Gulls certainly held the town, though a few straggling Crows were now and then seen in it. At the slaughterhouses on the prairies below the town I saw a flock of Crows drive off a number of Gulls, but probably the latter were rather listless after eating heartily of the offal. A flock of about one hundred and twenty were noticed February 7, 1892; a few were perched apart on a tree or snag, uttering strange sounds, like 'koo-wow, kow-wow, koo-wow,' the last syllable drawled and accented or emphasized; then, with a slight spreading of the shoulders and the tail, the head being down and the tail drooped, they produced by a curious chattering of the bill a sound (not made in the throat, I judged) which resembled that of horny plates struck

together, and causing an odd shuddering of the head and even of the body. This was repeated a few times, varied with a noisy 'caw, caw.'"

Mr. B. J. Bretherton writes me as follows: "The Northwest Crow is found at Kadiak, Alaska, in immense numbers throughout the year, but in the winter months they congregate in large flocks and therefore are more noticeable. In general appearance and manners they greatly resemble the English Jackdaw; they are easily tamed and become interesting pets, showing great fondness for their masters

"During the winter months they feed almost entirely on mussels; in summer they resort to the salmon streams and live mostly on fish; they also eat berries. Their call note is the regular 'caw' of a Crow, but they will also sit by the hour and sing in a low minor key, which is quite pleasant to hear. They are very bold, and quite fearless, and when one is shot the others will fly around the gunner, uttering cries of distress and anger, often coming within arm's length. They are very troublesome to the natives when drying salmon in the fall. In April they go into the interior of the island to nest, and but few are seen until August. I have never found their nests."

Mr. F. Bischoff found the Northwest Crow nesting near Sitka in the spring of 1866, and Mr. William H. Dall observed it near St. Paul, Kadiak Island, Alaska, on June 6, 1874. Eggs taken by both of these gentlemen are now in the United States National Museum collection. Four or five eggs are usually laid to a set, and neither these nor the nests differ materially from those of the Common Crow; they average a trifle smaller, and the same description will answer for both. In the more northern portions of the range nidification usually begins in the latter part of May or the beginning of June.

The average measurement of eight eggs from St. Paul, Kadiak Island, and Sitka, Alaska, is 39.62 by 27.43 millimetres, or 1.56 by 1.08 inches. The largest egg measures 41.66 by 27.94 millimetres, or 1.64 by 1.10 inches; the smallest, 36.07 by 27.94 millimetres, or 1.42 by 1.10 inches.

The type specimen, No. 12841 (Pl. 4, Fig. 15), from a set of five eggs taken by Mr. F. Bischoff, near Sitka, Alaska, in the early part of June, 1866, represents an average egg of the species.

### 165. Corvus ossifragus Wilson.

FISH CROW.

*Corvus ossifragus* Wilson, American Ornithology, V, 1812, 27, Pl. 37, Fig. 2.
(B 429, C 229, R 283, C 343, U 490.)

Geographical range: Atlantic and Gulf coasts of the United States; from southern Connecticut, the lower Hudson Valley, and Long Island, New York, south to Florida and Louisiana; casually to southeastern Massachusetts (Plymouth County).

The Fish Crow is a smaller bird than our Common Crow, and is readily distinguished from the latter on this account, as well as by the difference in its call notes. It is a resident throughout the year from the coast of Virginia and

Maryland southward, and occasional specimens winter somewhat farther north. In the lower Hudson Valley and along the shores of Long Island, New York, it is not uncommon in summer, but in southeastern Massachusetts it can only be considered a straggler. A few probably breed in suitable localities in southeastern Connecticut, and it only commences to be fairly common from southern New Jersey southward. In the vicinity of Washington, District of Columbia, it is found at all seasons of the year. Where both species are abundant, specimens are sometimes found which appear to be hybrids, and it is not unlikely that they interbreed occasionally. As a rule, the Fish Crow is rarely found at any great distance inland above tide water, and then usually only along the shores of the larger streams.

Its general habits are similar to those of the Common Crow, and it is often seen in company with them, especially in winter. They, however, appear to be less sociable, and on the whole are also less suspicious and more curious. Their food is also similar, though the proportions of vegetable and animal matter seem, in some localities at least, to be more equally divided than appears to be the case with the Common Crow. It is generally supposed that the Fish Crow lives more on animal food than its larger relative, which is probably the case in some places, but this does not appear to hold good in the vicinity of Washington, District of Columbia, or in some other localities. Mr. W. E. D. Scott states that on the Gulf coast of Florida they congregate in large flocks in the fall of the year, and that the berries of the palmetto constitute one of their favorite foods.

In the vicinity of Charleston, South Carolina, according to Audubon, they feed to a considerable extent on fruits, and he accuses them especially of committing great depredations upon the ripe figs; he also states that they feed on various sorts of berries, particularly those of the common holly (*Ilex cassina*), and those of the tallow tree (*Stillingia sebifera*).[1]

Some stomachs sent to the United States Department of Agriculture from St. Lucie and Lake Worth, Florida, contained remnants of figs and dewberries, as well as various seeds, while some from the vicinity of Washington, District of Columbia, contained seeds and berries of the cat briar (*Smilax*), mistletoe, wild rice. hackberry, locust, mulberry, etc.

Dr. A. K. Fisher tells me that on the coasts of Georgia and South Carolina he has seen numbers of them sitting on piles of old wharves, from which they would fly over the water, pick up something, and return to the piles again to eat it at their leisure. On the seashore they probably subsist mainly on small fish, crabs, and other crustaceans, and such offal as is washed ashore. Like their larger relatives, they are also accused of destroying the young and eggs of smaller birds, and, according to Audubon, in Florida they even plunder the nests of the Cormorants and White Ibis. In the Smithsonian grounds, Washington, District of Columbia, they have been noticed repeatedly carrying off and eating the young of the English Sparrows, and Dr. Fisher saw one chasing

[1] History of North American Birds, Vol. II, p. 254.

a Willet, near Sing Sing, New York, in the spring of 1885. While the Fish Crow undoubtedly does destroy the young and eggs of some birds in certain localities, it does not do so habitually. Mr. William Palmer, of Washington, District of Columbia, tells me that he found four Fish Crows' nests, with eggs, during the first ten days in May, 1894, on a hill near Four-Mile Run, in Alexandria County, Virginia, and also four nests of the Green Heron, containing eggs, one of these nests being only 40 feet from one of the Fish Crows' nests. Notwithstanding that none of the Herons were seen close to their nests, while the Fish Crows were at home and constantly flying about, so that they could not help seeing the Herons' eggs, none were troubled and all contained full sets. Three of the Fish Crows' nests were placed in pines, and one in a wild cherry tree, about 45 feet from the ground. Fish Crows can often be seen flying up and down the Potomac River, just over the water, looking for food, and when they find anything they flutter over it like a Tern. They may often be seen resting on the stakes left in the river by fishermen.

Their call notes appear to be less harsh and are uttered in a more drawling manner than those of the Common Crow; they are also more variable. They consist of a clear "cah" or "cahk," repeated at intervals of about thirty seconds, and are usually uttered while the bird is perched on the extreme top of a tree. They also utter a querulous "maah, maah" or "whaw, whaw," varied occasionally to "aack, aack," or "waak, waak." It is almost impossible to reproduce such sounds accurately on paper, and no two persons would render them alike. Their flight is stated to be more graceful than that of the Common Crow; they are also said to soar and to elevate their wings more while circling about, especially during the mating season; but I must confess that I can not see much difference, and I have watched both species closely.

In the neighborhood of Washington, District of Columbia, they nest fully a month later than the Common Crow, nidification rarely beginning before May 5, while Audubon reports them as breeding in February in southern Florida, and correspondingly later northward. The only other Florida records I have are likewise in May, one from the Kissimmee River, on May 2, 1876, and the other from near San Mateo, Putnam County, May 13, 1892, the latter date being given by Dr. Ralph. These eggs were quite fresh, and the set was probably not completed when taken. Mr. Theodore W. Richards states that on the coast of Virginia, where this species is much more common than the American Crow, the breeding season is at its height during the first three weeks in May; and in my opinion the majority of these birds seem to nest in this month throughout the greater part of their range.

The nest itself resembles that of the Common Crow, but is, as a rule, somewhat smaller, and like that of the former varies in composition according to locality. A nest taken by Dr. Ralph near San Mateo, Florida, was composed of sticks with a little Spanish moss attached to them, and was lined with pine needles, strips of cypress bark, and old Spanish moss. It was placed in the top of a slender pine tree, in low, flat pine woods, 81 feet above the ground. Some nests

are lined with dry cow and horse dung, cattle or horse hair, dry leaves, eel-grass, and shreds of cedar bark, while pine needles seem to be present to some extent in most of them. They are mostly placed in evergreens, such as pines and cedars, and generally in the tops, either in natural forks or on horizontal limbs, close to the trunk, usually 20 to 50 feet from the ground. They prefer to nest near water, but occasionally a pair will be found making an exception to this rule, and nests have been found fully 2 miles away from the nearest stream or swamp. Both sexes assist in incubation, which lasts from sixteen to eighteen days, while the young remain in the nest about three weeks. Only one brood is raised in a season, but if the first set of eggs is taken they will lay another, and not infrequently in the same nest. The eggs number four or five to a set, very rarely more. These are miniature counterparts of those of the Common Crow, showing the same range of variation in shape and markings, and one description will answer for both species, excepting only the pinkish-colored eggs of the former. I have not seen this peculiar tint among the eggs of this species.

The average measurement of forty-six eggs in the United States National Museum collection is 37.17 by 26.97 millimetres, or about 1.46 by 1.06 inches. The largest egg of the series measures 41.66 by 25.40 millimetres, or 1.64 by 1 inches; the smallest, 35.05 by 25.65 millimetres, or 1.38 by 1.01 inches.

The type specimen, No. 23745 (Pl. 4, Fig. 16), from a set of four eggs, was taken near Washington, District of Columbia, on May 9, 1887, while No. 25271 (Pl. 4, Fig. 17), from a set of five, was taken in Northampton County, Virginia, on May 25, 1891. Both were collected by Mr. Theo. W. Richards, and represent the light and dark colored types found among the eggs of this species.

## 166. Nucifraga columbiana (Wilson).

CLARKE'S NUTCRACKER.

*Corvus columbianus* Wilson, American Ornithology, III, 1811, 29, Pl. 20, Fig. 3.
*Nucifraga columbiana* Audubon, Ornithological Biography, IV, 1838, 459, Pl. 362.
(B 430, C 230, R 284, C 344, U 491.)

Geographical range: Mountainous portions of western North America; from Arizona and New Mexico north to northern Alaska (Kowak or Putnam River); east to and along the eastern slopes of the Rocky Mountains to the Black Hills, South Dakota; casual in southeastern Dakota, Kansas, Nebraska, Missouri, and Arkansas.

Clarke's Nutcracker, more generally known as "Clarke's Crow," and in some localities as "Meat Bird," "Moose Bird," and "Camp Robber," ranges throughout the mountain regions of western North America, reaching the southern limits of its habitat in about the northern half of New Mexico and Arizona; to the eastward it reaches the eastern slopes of the Rocky Mountains and the outlying spurs of this range, as the Black Hills in western South Dakota, while to the north it has been met with by Lieut. George M. Stoney, United States

Navy, in the valley of the Kowak or Putnam River, in northern Alaska, and within the Arctic Circle. Mr. F. Stephens states: "In southern California it is never seen far from the piñon belt which extends in a series of small forests along the desert face of the higher mountains, at altitudes of from 3,000 to 6,000 feet. It is gregarious in its habits and wanders about a great deal, but can scarcely be called a migrant here. It breeds in the higher pine-forests in the San Bernardino Mountains, not far from the desert side."

Mr. William G. Smith sent me the following notes about this species from Colorado: "Common at high altitudes during the fall and winter. I have never taken a nest, but have seen young birds in May. They are very tame where not much molested; one entered my tent while camped in Estes Park. By many persons this bird is called 'Camp Robber,' owing to its daring and thieving propensities around camp fires. When the young arrive here, their throats and breasts are frequently much stained with red from the juice of some berry they have been feeding on elsewhere; while here they fed mostly on the seeds of the pine, occasionally alighting on the ground after grasshoppers and other insects."

Dr. C. Hart Merriam met with it on the San Francisco Mountain, in Arizona, and says: "Breeds commonly in the spruce belt, occasionally descending to the pines in summer. In September, when the piñon nuts were ripening, it came down the mountain in flocks, and was often seen in the piñon belt with the Piñon and Woodhouse's Jays. At the same time it was common at the uppermost limit of the dwarf spruce of the subalpine zone."[1]

He also met with it in the spruce belt on all the mountains visited by his party in 1890 in south central Idaho; several specimens were caught in marten traps baited with meat.[2]

This interesting species is quite common in suitable localities throughout its range, and excepting perhaps in the more northern parts it is an irregular resident wherever found. There is no question that they are great wanderers at times, but this propensity is more likely the result of necessity than choice, and depends mainly on the food supply. In their general habits they resemble certain Woodpeckers as much as they do the *Corvinæ*, and have many traits in common with these birds. I well remember how elated I was over my first specimen, which I obtained after a long chase through soft, slushy snow, thinking I had secured a new Woodpecker, its undulating flight resembling that of one of these birds very closely.

Excepting the breeding season, Clarke's Nutcrackers are sociable, inquisitive, and exceedingly noisy birds, and are readily detected on this account when moving about in flocks of a hundred or more in search of good feeding grounds; they are quite omnivorous, and nothing edible is rejected by them. In the winter their food consists principally of the seeds of different species of coniferous trees, while at other times it is quite varied, including berries of various kinds, beetles, and other insects and their larvæ, including butterflies (which I have seen them catch on the wing like a true Flycatcher) and grasshoppers.

[1] North American Fauna, No. 3, U. S. Department of Agriculture, 1890, p. 94.
[2] North American Fauna, No. 5, U. S. Department of Agriculture, 1891, p. 100.

They also eat the large, wingless black crickets (*Anabus simplex*), which are exceedingly abundant and destructive wherever found, overrunning large sections of country and devouring everything green and edible in their way. I have seen flocks of these birds scattered over the sagebrush-covered mesas (table-lands) forming the southern foothills of the Blue Mountains, in Oregon, industriously engaged in catching these repulsive-looking insects and apparently eating them with a relish. They seemed to be especially noisy at such times, calling each other constantly and having a jolly good time generally. While usually rather shy and not readily approachable within gunshot, I have occasionally seen a few much bolder and more inquisitive than the rest, alighting among my chickens in the back yard, and feeding with them. They spend considerable time on the ground in search of food, hopping about from place to place like Jays, looking here and there for a choice morsel. They will hang to the bark of a tree precisely like a Woodpecker in search of grubs, and again to the under side of a pine cone, like a Crossbill, and apparently extract the seeds with equal dexterity. Their call notes are harsh and far-reaching, and consist mainly of a loud, rasping "chaar, chaar," which can be heard for a long distance, and when a number are together the noise made by them becomes rather disagreeable. They do not appear to destroy the eggs or young of smaller birds, but do far more good than harm, and on this account deserve protection.

The breeding season, considering the character of the country frequented by these birds, commences very early, and this accounts for the few nests which have as yet found their way into our oölogical collections. Mr. Denis Gale found a nest of this species, containing three fresh eggs, in Boulder County, Colorado, March 5, 1888, at an altitude of about 8,500 feet, when the mountain sides were still covered with deep snow. A second nest, also containing three fresh eggs, was found by him on April 16, 1889, and in this case he had noticed the birds building fully a month previous.[1]

Capt. B. F. Goss also found Clarke's Nutcracker breeding in the vicinity of Fort Garland, Colorado, where he obtained a nest with young birds on May 21, 1879.

I am not aware of any nests and eggs of this interesting species having been taken, excepting the two found by Mr. Gale and those secured by myself near Camp Harney, Oregon, April, 1876 and 1878. I obtained the first evidence of their breeding in that vicinity on May 5, 1875, when I found several young birds, but a few days out of the nest and not yet able to fly well; they were sitting on the branches of a large juniper tree in Rattlesnake Creek Canyon, about 3 miles north of the Post. As this tree happened to contain a cavity which evidently had been used by some bird as a nesting site in previous years, I came to the erroneous conclusion that Clarke's Nutcracker nested in holes, which caused me to examine many of them without results. In March, 1876, I recommenced what looked like an almost fruitless search, in which I had

[1] For more detailed accounts of these two nests see my articles in The Auk (Vol. VI, 1889, pp. 226–236, and Vol. VII, 1890, p. 92).

most of the time to tramp through snow from 2 to 4 feet deep; after having examined a great many cavities, mostly in junipers, I was almost ready to give up the task, when I finally examined the pines more closely, and noticed now and then an apparently round ball on the horizontal limbs of some of these trees, which I took to be nests of Fremont's Chickaree, *Seiurus hudsonicus fremonti*, which is very common in this locality. The majority of these supposed squirrels' nests were by no means easily reached, and after trying to dislodge their occupants with sticks, stones, or occasionally with a load of shot, and invariably failing to bring anything to light, I ceased to trouble myself further about them. Being more puzzled than ever, I was about to give up the search for their nests, when, on April 22, after having made more than a dozen fruitless trips, I saw a Clarke's Nutcracker flying quietly and silently out of a large pine about 50 yards ahead of me. This tree had a rather bushy top and was full of limbs almost from the base and was easy to climb. As I could not see readily into the top from below, I climbed the tree. Failing to see any sign of a nest therein, and being completely disgusted, I was preparing to descend when, on looking around, I noticed one of these supposed squirrels' nests placed near the extremity of one of the larger limbs, near the middle of the tree, and 25 feet from the ground; it was well hidden from below, and sitting therein, in plain view from above, I saw not a squirrel, but a veritable Clarke's Nutcracker. I had found a nest at last, quite unexpectedly, and not a day too soon. As it was I was almost too late, for the nest contained a young bird just hatched, and two eggs with the shells already chipped and on the point of hatching. However, as even damaged specimens, particularly rare ones like these, were better than none, I took them, but left the young bird in the nest. The parent, trembling with fear, allowed me to almost lay my hand on her before she fluttered off, and I was scarcely 2 feet away from the nest before she was on it again. During the whole time she remained perfectly silent. Not half an hour later I found a second nest, containing three young, perhaps a week old. Between April 24 and 30 I found at least a dozen more nests; these, however, all contained young in different stages of growth, some nearly large enough to leave the nest, and none contained more than three young.

In the spring of 1877 I commenced my search for nests on March 15, but failed to see a single bird where I had found them comparatively common during the previous season. Their absence was due in this case to the lack of suitable food. No ripe pine cones were to be found, on the hulled seeds of which the young are at first exclusively fed.

During the winter of 1877–'78 a few of these birds occupied their old haunts again, and I began my search as usual in the latter part of March. On April 4, 1878, I found the first nest. It was placed near the extremity of a small limb of a pine, about 40 feet from the ground, and was very hard to get at. In trying to pull the limb down with a rope, so that it could be reached from a stronger one below, it snapped and the eggs were thrown out of the nest. This set also contained three eggs, and incubation was well advanced. On April 8

I found another nest containing two eggs with large embryos. This one was also in a pine tree near the extremity of one of the limbs, about 16 feet from the ground. The only way this could be reached was by leaning a pole against the limbs of the tree and climbing to the nest, in which I succeeded after a good deal of labor and trouble. All of the nests found were placed in nearly similar situations, on horizontal limbs of pines, *Pinus ponderosa*, from 15 to 45 feet from the ground, in rather open situations at the outskirts of the heavier forests, and usually on side hills with a southeasterly exposure, at an altitude (estimated) of from 5,000 to 5,500 feet.

Both of Mr. Gale's nests were placed in low, scrubby pines, *Pinus ponderosa*, the first in one about 20 feet high, which branched out from the ground, with a probable spread of 15 feet. The nest was situated about 30 inches from the main stem, near a bunch of scrub, and firmly saddled on a three-pronged fork of a stout limb 3 inches in diameter, with smaller ones growing around it, so that nothing save the overthrow of the tree itself could possibly dislodge it. This nest was placed about 8 feet from the ground, and is now, with the eggs it contained, in the United States National Museum collection, having been kindly presented by Mr. Gale. His second nest with eggs, taken April 16, 1889, was also found in a small, scrubby pine only 12 feet high and 6 inches in diameter; it was placed about 9 feet from the ground, and resembles the first in every particular, being a little bulkier perhaps.

He found five other nests of this species, none of them containing eggs, however; four of these were placed in spruce trees, none over 25 feet from the ground and two only 8 feet up. Mr. Gale's nest, now in the United States National Museum, was the only one found by him saddled on a branch away from the stem. The majority of sites chosen offered little concealment, but in every case especial care was observed in selecting one affording thorough protection from the assaults of the fierce March winds which prevail in this mountain region. The nests examined by me near Camp Harney, Oregon, were all found in sheltered situations on side hills where they were well protected from heavy winds, and the horizontal limbs selected for building sites were usually strong and bushy, with numerous small twigs among which the nests could be securely built. All of the nests observed were saddled on such limbs, sometimes fully 15 feet from the trunk.

An average nest of Clarke's Nutcracker may be described as follows: The nest proper is placed on a platform of dry twigs, mostly those of the western juniper, *Juniperus occidentalis*, and of the white sage, averaging about three-sixteenths of an inch in thickness, and varying from 8 inches to a foot in length. These twigs, which also help to form the sides of the nest, are deftly matted together and to the smaller twigs of the limb on which the nest is saddled; they are further held together and bound by coarse strips of the inner bark of the juniper tree; these strips are mixed among the twigs and are very suitable for this purpose. The inner nest is a mass of these same bark strips, only much finer, having been well picked into fine fiber; it is quilted together with decayed

grasses and pine straw, forming a snug and comfortable structure. .No hair or feathers entered into the composition of any of these nests. The outer diameter measures from 11 to 12 inches by about 7 inches in depth; the cup is from 4 to 5 inches wide and 3 inches deep. The quilted inner walls are fully 1½ inches thick; it is quite deep for its size, and the female while incubating is well hidden. Nest building must occasionally begin in the latter part of February, but more frequently in March, and it appears to take these birds some time to complete one of these structures. Both parents assist in this, as well as in incubation, and the male is apparently equally as attentive and helpful as the female. While they are noisy, rollicking birds at all other times, during the season of reproduction they are remarkably silent and secretive, and are rarely seen. The eggs, usually three in number but occasionally only two, are deposited during March and April, according to locality, when the mountains are still covered with considerable snow; incubation lasts, as nearly as I can judge, about sixteen or seventeen days. The young are fed exclusively on hulled pine seeds, and grow very rapidly, being able to leave the nest in about eighteen days. Their plumage generally is much darker then than that of the adults, and they are readily distinguishable They follow the parents about for some time, and when able to provide for themselves all these birds suddenly disappear from the vicinity of their breeding grounds. This happens about the latter part of May or early in June, and they are not seen again until fall, probably returning to the higher mountains about this time. Only a single brood seems to be raised in a season.

The eggs of Clarke's Nutcracker are ovate and elongate ovate in shape. The ground color is usually pale gray green, occasionally a clearer pale green. They are rather sparingly flecked, spotted, and blotched with minute markings of different shades of brown, gray, and pale lavender, usually heaviest about the larger end of the egg, and these form sometimes a fairly defined wreath. In others they are more evenly distributed over the entire egg, but never thick enough to hide the ground color. In some the lower half of the egg is almost unspotted. The shell of these eggs is close grained, smooth, rather thin, considering their size, and slightly glossy.

The average measurement of nine eggs, six of these only in the United States National Museum collection, is 33.86 by 23.31 millimetres, or about 1.33 by 0.92 inches. The largest egg measures 34.80 by 22.86 millimetres, or 1.37 by 0.90 inches; the smallest, 33.78 by 22.61 millimetres, or 1.33 by 0.89 inches.

The type specimen, No. 20384 (Pl. 3, Fig. 22), from a set of two badly incubated eggs, Bendire collection, was taken by the writer near Camp Harney, Oregon, on April 8, 1878; No. 23683 (Pl. 3, Fig. 23), is from a set of three eggs collected near Gold Hill, Colorado, on March 5, 1888, by Mr. Denis Gale.

## 167. Cyanocephalus cyanocephalus (Wied).

PIÑON JAY.

*Gymnorhinus cyanocephalus* Wied, Reise in das innere Nord Amerika, II, 1841, 21.
*Cyanocephalus cyanocephalus* Stejneger, Auk, I, 1884, 230.
(B 431, C 231, R 285, C 345, U 492.)

Geographical range: The plateau regions of western North Amerika; from the Rocky Mountains west to the Pacific Coast ranges; north to southern British Columbia; south to northwestern Texas, Lower California, and northern Mexico; casually to Kansas and Nebraska.

The Piñon Jay, locally known also as "Nutcracker," "Maximilian's Jay," "Blue Crow," and as "Piñonario" by the Mexicans, is rather a common resident in suitable localities throughout the southern portions of its range, while in the northern parts it is only a summer visitor, migrating regularly. It is most abundantly found throughout the piñon and cedar-covered foothills abounding between the western slopes of the Rocky Mountains and the eastern bases of the Sierra Nevada and Cascade ranges in California, Nevada, and Oregon.

It is an eminently sociable species at all times, even during the breeding season, and is usually seen in large, compact flocks, moving about from place to place in search of feeding grounds, being on the whole rather restless and erratic in its movements; you may meet with thousands in a place to-day and perhaps to-morrow you will fail to see a single one. It is rarely met with at altitudes of over 9,000 feet in summer, and scarcely ever in the higher coniferous forests; its favorite haunts are the piñon-covered foothills of the minor mountain regions, the sweet and very palatable seeds of these trees furnishing its favorite food during a considerable portion of the year. In the summer they feed largely on insects of all kinds, especially grasshoppers, and are quite expert in catching these on the wing; cedar and juniper berries, small seeds of various kinds, and different species of wild berries also enter largely into their bill of fare. A great deal of time is spent on the ground, where they move along in compact bodies while feeding, much in the manner of Blackbirds, the rearmost birds rising from time to time, flying over the flock and alighting again in front of the main body; they are rather shy and alert when engaged in feeding. I followed a flock numbering several thousands which was feeding in the open pine forest bordering the Klamath Valley, Oregon, for more than half a mile, trying to get a shot at some of them, but in this I was unsuccessful. They would not allow me to get within range, and finally they became alarmed, took wing, and flew out of sight down the valley. On the next day, September 18, 1882, I saw a still larger flock, which revealed its presence by the noise made; these I headed off, and awaited their approach in a dense clump of small pines in which I had hidden; I had not long to wait, and easily secured several specimens. On April 4, 1883, I saw another large flock feeding in the open woods,

evidently on their return to their breeding grounds farther north, and by again getting in front of them I secured several fine males whose testes were but slightly enlarged. These birds are said to breed in large numbers in the juniper groves near the eastern slopes of the Cascade Mountains, on the head waters of the Des Chutes River, Oregon. I have also seen them in the Yakima Valley, near old Fort Simcoe, in central Washington, in June, 1881, in an oak opening, where they were quite numerous. Their center of abundance, however, is in the piñon or nut-pine belt, which does not extend north of latitude 40°, if so far, and wherever these trees are found in large numbers the Piñon Jay can likewise be looked for with confidence.

Mr. F. Stephens writes me that he saw a mixed flock of this species and Clarke's Nutcrackers within 20 miles of the line of Lower California.

Mr. L. Belding found them abundant in the piñons between Campo and Hansen's, Lower California, in May, 1884; while Mr. A. W. Anthony reports them abundant on the San Pedro Martir Mountains, in the same State, at altitudes of from 7,000 to 11,000 feet.[1]

On the eastern slopes of the Rocky Mountains this species is much rarer than on the western border, but it has been found in northwestern Montana, on Marias River, and has even been recorded from eastern Kansas and Nebraska, where, however, it can only be considered a straggler.

The first nests and eggs of this species were found by Mr. Charles E. Aiken, near Colorado Springs, Colorado, on May 13, 1874, where he noticed four other nests at the same time; in all of these the young had just hatched. The set found by him contained five eggs, in which incubation was well advanced; two of these eggs he kindly gave me, and they are now in the United States National Museum collection. The first naturalist, however, who observed the nests and young of this species was Mr. Robert Ridgway, who found a colony nesting in a low range of piñon-covered hills in the vicinity of Carson City, Nevada, on April 21, 1868.

Mr. H. C. Parker, of Carson City, took two sets of eggs of this species in the same locality, on April 5, 1878, where Mr. Ridgway observed them ten years previously, and one of these is now in the United States National Museum collection. Subsequently he found another colony of these birds in another portion of the same range of hills, where he states they were breeding by thousands.

The late Capt. B. F. Goss also found this species breeding in the vicinity of Fort Garland, Colorado, at an altitude of about 8,500 feet, during the first two weeks in May, 1879, and took nine sets of their eggs, one of which is now before me. Their eggs were also taken in northern New Mexico at about the same time.

Their call notes are quite variable; some of them are almost as harsh as the "chaar" of the Clarke's Nutcracker, others partake much of the gabble of the Magpie, and still others resemble more those of the Jays. A shrill, queru-

[1] Proceedings of California Academy of Sciences, Vol. II, 1889, pp. 293, 294.

lous "peeh, peeh," or "whee, whee," is their common call note. While feeding on the ground they keep up a constant chattering, which can be heard for quite a distance, and in this way often betray their whereabouts.

The nests are deep, bulky, and compactly built structures, measuring about 10 inches in outer diameter by 7 inches in height; the cup of the nest is about 4 inches in diameter by 3 inches in depth. Exteriorly the nests are constructed of piñon, sagebrush, or juniper twigs, and shreds of bark from the same, while the inner lining consists of finer shreds of similar materials, plant fibers, fine rootlets, and dry grass, all well woven together, the component parts of the nest varying somewhat in different localities. The nests are usually placed in forks or on horizontal limbs of piñon or juniper trees, generally from 5 to 12 feet from the ground. They are rarely well hidden from view and ordinarily can be seen for some distance.

In the middle portions of their range nidification begins early in April and possibly still earlier farther south, while to the northward and at higher altitudes it is protracted until the first week in May. From three to five eggs are laid to a set, those numbering four being most often found. Incubation lasts about sixteen days. The Piñon Jays are close sitters and, like Clarke's Nutcracker, are devoted parents. The young are able to leave the nest in about three weeks, and may easily be distinguished by their somewhat duller plumbeous blue color. They at once form in flocks and rove about from place to place in search of food.

The eggs of the Piñon Jay are quite variable in shape, ranging from ovate and short ovate to elliptical ovate. The ground color is bluish-white, this being covered all over with minute specks of different shades of brown, in some cases, and larger spots and blotches in others, these being generally heaviest about the larger end. An occasional set is blotched heavily enough to nearly hide the ground color, but this appears to be rarely the case. The shell of these eggs is close grained, finely granulated, slightly glossy, and much stronger than that of the preceding species.

The average measurement of twenty-five eggs in the United States National Museum collection is 30.11 by 22.18 millimetres, or about 1.19 by 0.87 inches. The largest egg measures 31.75 by 23.37 millimetres, or 1.25 by 0.92 inches; the smallest, 26.92 by 22.10 millimetres, or 1.06 by 0.87 inches.

The type specimens, Nos. 24712 and 25315 (Pl. 3, Figs. 24 and 25), both from sets of four eggs, from the Ralph collection, were taken near Fort Garland and Cañon City, Colorado, on May 10, 1879, and May 16, 1890, and represent the lighter and darker colored phases found among the eggs of this species.

## Family STURNIDÆ. Starlings.

### 168. Sturnus vulgaris Linnæus.

STARLING.

*Sturnus vulgaris* Linnæus, Systema Naturæ, ed. 10, I, 1758, 167.
(B —, C —, R 279, C 363, U [493].)

Geographical range: Europe and northern Asia; accidental in Greenland. Introduced in the United States.

The Starling, a common European species, is admitted to our fauna from the fact that a specimen has been taken in Greenland, where it can only be considered a straggler.

Mr. Henry Seebohm says: "The Starling breeds throughout Europe north of latitude 44°, and is a resident in the Azores. In Scandinavia it is found as far north as latitude 69°, in Sweden and Finland up to latitude 65°, and in the Urals only up to latitude 57°, which appears to be its northern limit in Asia. The European birds that are migratory winter in the south of France, the Spanish Peninsula, Italy, Greece, North Africa, and Palestine. In Asia it breeds in South Siberia, Persia, and Turkistan, ranging as far east as the sources of the Amoor, passing through Mongolia, on migration, and wintering in India.

"The Starling is almost as closely associated with man as the Sparrow; but, unlike that bird, it seems to have a peculiar way of accommodating itself to its surroundings with the greatest ease. Thus we see it almost everywhere and in every variety of scenery. It will share the eaves and the dovecot with the Sparrows and Pigeons. It will nestle in the hollow trees, far away from houses, or make its home just as easily in the sides of the stupendous ocean cliffs in company with the noisy crowd of sea birds, or on the limestone rocks farther inland. After the breeding season the Starling becomes even more widely distributed, and from August until the following spring haunts fields and marshes, commons, gardens, and the low-lying shores, as its food supply may be most abundant. The Starling is a gregarious bird at all seasons of the year; but this habit is most marked after the nesting season, for in the spring the scarcity of suitable breeding places usually disperses them.

"Early in the year, sometimes as soon as the middle of January, the Starling returns almost daily to its old nesting place, and in a week or so the male begins his unpretentious song. He usually sings when perched on a chimney or on the eaves near his nesting hole, or on the tree tops near at hand, and his song is warbled forth as he ruffles the feathers of his head and throat and shakes and droops his wings, as though full of nervous excitement. Although many of the Starling's notes are harsh, still some of them are very full and pleasing, and heard as they are, at a season when every sign of returning spring is eagerly looked for and welcomed, are certainly one of the most cheerful sounds that greet the ear. Each note is uttered in seeming caprice; the harsh ones are

mingled with the sweet ones with no approach to order. It is indeed a strange song, and can not be mistaken for that of any other British bird, the Rose-colored Starling excepted. The Starling's alarm notes are very harsh and rapidly repeated, resembling somewhat those of the Missel Thrush. Its call note is a clear, long-drawn, piping cry.

"Early in April, sometimes not until the beginning of May, the Starlings have mostly mated and gone to their breeding holes. Previous to this, however, much quarreling goes on for the choice of suitable sites. The strong gain the best-located holes, while the weak seek quarters elsewhere. The Starling will build its nest almost anywhere, and it needs but slight encouragement to take up its quarters in any suitable hole or box placed for its reception. It will even dislodge large tiles and burrow considerable distances under the eaves, and its bulky nest often stops up some spout, to the dismay of the householder. A hole in the gable or inside the dovecot are also favorite places, while its partiality for holes in trees is none the less. It also commonly breeds in ruins, churches, and old masonry of every description. In the wilder portions of the country the Starling selects a hole either in a tree or a rock for its purpose, and it will often breed in great numbers in caves or in crevices of the ocean cliffs.

"The nest is sometimes but a few inches from the entrance to the hole, at others it is several feet, and in many cases, especially in trees and rocks, is absolutely inaccessible. In the outer Hebrides, where trees are absent, the Starling breeds, according to Mr. Gray, under the stones on the beach, in disused rat holes, in turf dikes, and in holes in walls. Saxby states that in Shetland it breeds in peat stacks and rabbit holes. It has also been known, in one or two instances, to build an open and exposed nest in trees, to rear its young in a hole in the ground, and to share the same nest with a Magpie.

"The Starling's nest is a somewhat slovenly structure, made of straw, dead grass, and rootlets, sometimes a twig or two, and is lined with a few feathers, a little wool, or even a scrap or two of moss, paper, rag, or twine. In many cases the birds do not trouble about a lining at all, and the cup of the nest is entirely composed of straws, arranged very evenly and smoothly, but with a lot of straggling bents around it.

"The nest is in some cases much more elaborately made than in others, and in some holes the dry and powdered wood at the bottom almost does sole duty for a bed. With great perseverance the Starling will continue to build in the same hole, although its nest is repeatedly removed, and each year the birds will return to their old quarters.

"The food of the Starling is for the greater part of the year composed of worms, slugs, and beetles; but in winter they are often seen to feed on grain and seeds. In autumn they are very fond of fruit and berries. Elderberries are part of their favorite food, and soon the trees, which had previously bent under the weight of their clustering branches of black fruit, will be totally denuded. In severe weather they will sometimes feed on hips and haws, and are often seen on coasts searching for sand worms and various small mollusks."[1]

[1] History of British Birds, Seebohm, 1884, Vol. II, pp. 12–15.

Several attempts have been made to introduce this species into the United States, but until recently none have been permanently successful.

Mr. Frank M. Chapman, of the American Museum of Natural History in Central Park, New York City, writes me as follows on this subject:

"The last introduction of the Starling by Mr. Eugene Schiefflin has apparently been successful. The birds were liberated in Central Park, but the majority have left this and spread over the more northern part of the city. One pair bred under the eaves of this museum in the summer of 1893, and this year two pairs are breeding here, while still another has established itself in the roof of an apartment house close by. Mr. C. B. Isham, an assistant in the ornithological department, tells me that no less than ten pairs are passing the summer at Kingsbridge, near Spuyten Duyvel, and that he knew where five pairs nested there last year. They apparently raise two broods in a season and have become pretty well established here. They are resident, or nearly so, and as they have already experienced one of the most severe winters of recent years, it will not be the fault of the climate if they do not steadily increase in numbers."

An attempt to introduce this species near Portland, Oregon, has apparently failed, the birds liberated there having disappeared.

From four to seven eggs are laid to a set. The eggs vary in shape from ovate to elongate ovate; the shell is rather coarsely granulated and varies considerably in color, ranging from a pale greenish-blue to pale bluish-white.

The average measurement of forty specimens in the United States National Museum collection is 29.46 by 21.34 millimetres, or 1.16 by 0.84 inches; the largest egg measures 31.75 by 22.10 millimetres, or 1.25 by 0.87 inches; the smallest, 26.67 by 19.30 millimetres, or 1.05 by 0.76 inches. None of these eggs are figured.

## Family ICTERIDÆ. Blackbirds, Orioles, etc.

### 169. Dolichonyx oryzivorus (Linnæus).

BOBOLINK.

*Fringilla oryzivora* Linnæus, Systema Naturæ, ed. 10, I, 1758, 179.
*Dolichonyx oryzivorus* Swainson, Zoological Journal, III, 1827, 351.
(B 399, C 210, R 257, C 312, U 494.)

Geographical range: North America; north in the Dominion of Canada near the Atlantic coast to about latitude 47°, in the provinces of Quebec and Ontario to about latitude 45°, in Manitoba and Assiniboia to about latitude 52° N., and thence westward to southern British Columbia. In the United States west to Utah and eastern Nevada. South in winter to the West India Islands and South America.

The breeding range of the Bobolink, known also as "Skunk Blackbird" in the Northern States, as "Ortolan" and "Reedbird" on the Atlantic coast in the fall, as "Meadow-wink" in some of our Middle States, as "Ricebird" and "Maybird" in South Carolina, Georgia, and Louisiana, and as "Butterbird" in Jamaica,

extends from about latitude 40°, and occasionally, though rarely, from a little south of latitude 39°, northward through the southern portions of the Dominion of Canada, as already defined. From recent information obtained by me, it also breeds, in small numbers at least, on the Gulf coast of Louisiana, and probably also in northern Florida. It inhabits open prairie country, cleared and cultivated districts, but is never found in forests.

The Bobolink is a well-known and prime favorite with everyone throughout New England and the other Northern States, and few of our summer visitors are more popular. It usually arrives on its more southern breeding grounds about the middle of May, and correspondingly later northward. It is far more abundant east than west of the Rocky Mountains, but in suitable localities in the Great Salt Lake and Utah Lake valleys it is not uncommon, and Mr. H. W. Henshaw found it rather common in the fields about Provo, Utah, where the parent birds were noticed feeding their young July 25, 1872.

Mr. Robert Ridgway says: "The Bobolink seems to be spreading over all the districts of the far West wherever the cultivation of cereals has extended. We found it common in August in the wheat fields at the Overland Ranch, in Ruby Valley, Nevada."[1]

This last record remained the most western one for a number of years, but recently the United States National Museum collection received a skin taken by Mr. A. C. Brook, July 23, 1890, near Chilliwack, British Columbia, which extends its range across the continent. It is possible, as stated above, that this species is gradually extending its range westward, and the settling up of the country may have something to do with this; but it is equally certain that it is rapidly decreasing in numbers in many localities in our Eastern States where it was an abundant summer resident less than twenty years ago. This may be due to some extent to a gradual change of its range; but the enormous slaughter the Reedbird, or "Ortolan," as it is there called, is subjected to in the late summer, while lingering in the marshes bordering the Chesapeake Bay and similar localities on the Atlantic coast, on their migration to the south, is quite a factor in this matter, as many thousands are shipped at this season of the year to the markets of our larger cities, and Reedbirds or Ortolans on toast may be found on the menu of every first-class restaurant. In the marshes here they feed on the still soft seeds of the Indian rice or water oat (*Zizania aquatica*), which imparts a delicious flavor to their flesh; they soon become excessively fat, and the demand for Reedbirds is far greater than the supply; but fortunately the English Sparrow is nowadays extensively substituted for the genuine Ortolan, and will protract its gradual extermination for some time.

Another cause of its decrease is due to the enormous damage it does in the rice plantations of some of our Southern States, where they are very unwelcome but regular visitors both in the spring and early fall, and where many thousands are killed yearly.

[1] Explorations of the 40th Parallel, Vol. IV, 1877, pp. 500, 501.

Dr. C. Hart Merriam, chief of the Division of Ornithology and Mammalogy, United States Department of Agriculture, makes the following statement, respecting this species in his annual report for the year 1886:

"One of the most important industries of the Southern States, the cultivation of rice, is crippled and made precarious by the semiannual attacks of birds. Many kinds of birds feed upon rice, but the bird that does more injury than all the rest combined is the Bobolink of the North (*Dolichonyx oryzivorus*), called 'Reedbird' along the Chesapeake and 'Ricebird' in the South."

The following extracts from a letter from Capt. William Miles Hazzard, of Annandale, South Carolina, one of the largest rice growers in the State, bearing on this subject, is selected out of several in the above report:

"The Bobolinks make their appearance here during the latter part of April. At that season their plumage is white and black, and they sing merrily when at rest. Their flight is always at night. In the evening there are none. In the morning their appearance is heralded by the popping of whips and firing of musketry by the bird minders in their efforts to keep the birds from pulling up the young rice. This warfare is kept up incessantly until about the 25th of May, when they suddenly disappear at night. Their next appearance is in a dark yellow plumage, as the Ricebird. There is no song at this time, but instead a chirp which means ruin to any rice found in the milk. My plantation record will show that for the past ten years, except when prevented by stormy south or southwest winds, the Ricebirds have come punctually on the night of the 21st of August, apparently coming from seaward. All night their chirp can be heard passing over our summer homes on South Island, which is situated 6 miles to the east of our rice plantations, in full view of the ocean. Curious to say, we have never seen this flight during the day. During the nights of August 21, 22, 23, and 24, millions of these birds make their appearance and settle in the rice fields. From the 21st of August to the 25th of September our every effort is to save the crop. Men, boys, and women, with guns and ammunition, are posted on every 4 or 5 acres, and shoot daily an average of about 1 quart of powder to the gun. This firing commences at first dawn of day and is kept up until sunset. After all this expense and trouble our loss of rice per acre seldom falls under 5 bushels, and if from any cause there is a check to the crop during its growth which prevents the grain from being hard, but in milky condition, the destruction of such fields is complete, it not paying to cut and bring the rice out of the field. We have tried every plan to keep these pests off our crops at less expense and manual labor than we now incur, but have been unsuccessful. Our present mode is expensive, imperfect, and thoroughly unsatisfactory; yet it is the best we can do. I consider these birds as destructive to rice as the caterpillar is to cotton, with this difference, that these Ricebirds never fail to come."

From this it can readily be seen that our Southern planters have excellent reasons for destroying the Bobolink by all the available means in their power. The persistent warfare carried on against it must undoubtedly finally diminish its numbers very materially, and the present rarity of this species in many

localities in New England and other Northern States is, in my opinion, far more attributable to wholesale destruction than to change of breeding range.

Mr. E. A. McIlhenny, of New Iberia, Louisiana, tells me that it is a well-known fact among the rice planters of his State that the Bobolink, when feeding on the rice while still in the milky state, requires to wash its bill frequently to free it from the gummy matter accumulating on it from the rice milk. Knowing this, many planters, instead of keeping the rice fields flooded, as formerly, now draw off all the water about this time, making it necessary for the birds to go some distance to procure it, thereby lessening the destruction to some extent, while this treatment does not appear to injure the crop in the least.

After the Bobolink returns to his chosen summer home he is safe enough, at least from his most merciless enemy, man, as there no one looks on him as a nuisance. The males usually precede the females a few days, and generally return to the same localities from year to year. In its handsome spring dress of black and white the male forms one of the conspicuous features of a rural landscape, while its bubbling, metallic song, almost constantly uttered during the mating season, either while fluttering or hovering above the female in the air, or when perched on a fence, a shade tree by the roadside, or a weed stalk in a meadow or clover field, is certain to attract attention to the happy and joyous performer. No other bird seems to be in such exuberant, rollicking spirits at this time of the year as our male Bobolink. The females, however, are much less in evidence at all times, and are rarely seen unless especially looked for, keeping in the meadows, where the young grass hides them quite effectually from view. I have several times attempted to imitate their notes on paper, but have failed During the first few weeks after its arrival the male is full of song; one of its call notes sounds like "träck, träck," another like "tchäe-tchäe," and another like "killink, killink." By the middle of July they are almost silent again, and in some sections seem to disappear altogether. The Bobolink is still fairly common in all the dairy regions of central New York, and while at Holland Patent, in June and July, 1893, I saw but few of these birds after July 15, although quite a number of pairs breed there regularly; they had all apparently disappeared.

Their food consists mainly of seeds and grains of different kinds, and during the summer months also of insects, including grasshoppers, small caterpillars, etc., and on their breeding grounds they certainly do little or no damage.

In the more southern portions of its breeding range nidification begins usually about the last week in May or the first week in June, and the young have mostly left the nest by the time haying begins. In late seasons undoubtedly many nests are uncovered and destroyed by mowing machines, which are the principal factors of destruction of these birds in the north.

The nest is usually placed in a meadow or clover field, and sometimes several pairs nest close together. It is a gregarious and social bird, even during the season of reproduction, and loves company at all times. It is equally at home on the uplands as in the lower river bottoms, as long as these are sown to grass. As a rule the nest is hard to find; the female will rarely fly directly from it, but

runs for some distance through the grass before she takes flight, and approaches it in the same way. It is a frail structure, outwardly composed of dry weed stems and grasses, lined with finer materials of the same kind, and is usually placed in a slight natural depression of the ground and well concealed by a luxurious growth of grass or clover. An average nest measures about 4 inches in outer diameter by 2 inches in depth; the inner cup is about $2\frac{1}{2}$ inches in diameter by $1\frac{1}{4}$ inches deep. Sometimes a nest may be attached to several weed stems a little distance from the ground. Two such instances are recorded by Mr. Elisha Slate, of Somerset, Massachusetts, in the "Bulletin of the Nuttall Ornithological Club" (Vol. VI, 1881, pp. 117, 118). Want of space prevents me from quoting these here.

Mr. E. A. McIlhenny, of New Iberia, Louisiana, tells me that this species breeds in small numbers on Petite Anse Island, on the Gulf coast of Louisiana; and that he has taken two nests with eggs (one on April 18, 1891, and another on April 9, 1892). To set all doubts at rest, he kindly sent me the last-mentioned set, which contained five heavily incubated eggs, one of which was broken in blowing, and one of these is figured. He wrote at the same time: "I believe many of the Bobolinks breed here before they go north; the young birds are here all summer, but an old bird is never seen after the last of April, or after the oats are harvested. They nest in these fields. We shoot the young birds here in May, and again in September, in which months they are very fat and are considered very good eating."

On mentioning this to my friend, Dr. Ralph, who visits Florida every winter, he told me that he had noticed two pairs of Bobolinks almost daily, near San Mateo, Florida, from about the middle of May until the day of his departure, on June 4, 1892. These birds were most frequently seen near the banks of the St. John's River, close to an oat field, and probably were breeding there.

From five to seven eggs (usually five or six) are laid to a set, and only one brood is raised in a season. In the more southern parts of their breeding range the young are generally large enough to fly by July 1. They gather then in little flocks with the parents (the male assuming the garb of the female about this time) and are soon thereafter led by them to the marshes, near the seashore, in quest of their favorite food, which at this time of the year is Indian rice; and by August 15 they begin to assemble in the rice fields of the South, remaining there until near the end of September before moving on to their winter homes in South America. Their traveling is mostly done at night. The majority pass through Florida and the West India Islands on their way south, and not through Mexico via Texas.

The eggs are ovate or short ovate in shape. The shell is close grained and somewhat glossy. The ground color varies from pearl gray or pale ecru drab to a pale reddish brown or pale cinnamon rufous. They are irregularly blotched and spotted with different shades of claret brown, chocolate, heliotrope purple, and lavender markings, intermingled with each other, and varying greatly in size and intensity. Almost every set is differently marked, and it is extremely difficult to give a fair average description. In some specimens the ground color

is almost hidden, the markings being nearly evenly distributed in the shape of large blotches over the entire surface of the egg. In the majority, however, the darker markings are mainly confined to the larger end of the egg, while the paler ones are more noticeable in the middle and about the smaller end.

The average measurement of seventy-seven specimens in the United States National Museum collection is 21.08 by 15.71 millimetres, or 0.83 by 0.62 inch. The largest egg in this series measures 22.35 by 16.26 millimetres, or 0.88 by 0.64 inch; the smallest, 17.53 by 15.24 millimetres, or 0.69 by 0.60 inch.

The type specimen, No. 25338 (Pl. 6, Fig. 1), from a set of five eggs, Ralph collection, was taken on Shelter Island, New York, June 8, 1882, and represents one of the heaviest marked eggs of the series; and No. 25740 (Pl. 6, Fig. 2), from a set of five eggs, taken by Mr. E. A. McIlhenny, on Petite Anse Island, Louisiana, on April 9, 1892, represents one of the paler-colored specimens in the series.

## 170. Molothrus ater (Boddaert)

COWBIRD.

*Oriolus ater* Boddaert, Table des planches enluminées d'histoire naturelle, 1783, 37.
*Molothrus ater* Gray, Hand List of Birds, II, 1870, 36.
(B 400, C 211, R 258, C 313, U 495.)

Geographical range: United States and the southern parts of the Dominion of Canada, in the eastern portions to about latitude 49° N.; in the interior to Little Slave Lake, southern Athabasca, latitude 55° 30′, and probably still farther north; west to British Columbia, eastern Washington, eastern Oregon, Nevada, and southeastern California; south in winter to southern Mexico.

The breeding range of the Cowbird, also known as "Cow Bunting," "Cow Blackbird," "Shinyeye," "Blackbird," "Lazy Bird," "Clodhopper," and in former years on the plains as "Buffalo Bird," extends from our Southern States, excepting Florida, southern and western Texas, north into the southern parts of the Dominion of Canada. Westward its breeding range extends to eastern British Columbia, eastern Washington, eastern Oregon, Nevada, and probably southeastern California, where Dr. A. K. Fisher shot an adult male at Furnace Creek, in Death Valley, June 20, 1891. East of the Rocky Mountains the Cowbird is pretty generally distributed over the greater part of its range, excepting the extensive forest regions and some of the more southern States, where it appears to occur only sparingly. Its center of abundance is found in the States bordering the Upper Mississippi River and its numerous tributaries. West of the one hundred and thirteenth meridian (Greenwich), in the United States at least, it must be considered as a rare summer visitor, and, as far as I have been able to ascertain, it has not yet been found anywhere on the Pacific Coast west of the Cascade and the Sierra Nevada mountains except as a straggler. In the southern portions of the Provinces of Alberta and Assiniboia, Dominion of Canada, as far west as Calgary, I found this species remarkably abundant in the

latter part of May, 1894, along the line of the Canadian Pacific Railway, small parties of from six to twelve being almost constantly in sight, evidently on their way to their breeding grounds.

The most northern point where its eggs have been taken appears to be in the vicinity of Little Slave Lake, in southern Athabasca, in latitude 55° 30′ N. Mr. S. Jones, of the Hudson Bay Company, forwarded specimens from there to the Smithsonian Institution in 1868, but it is quite probable that this species ranges farther north.

Although I have traveled extensively over our westernmost States and Territories, I noticed the Cowbird on but very few occasions, and only found its eggs there twice; once on June 21, 1871, near Fort Lapwai, Idaho, in the nest of the Long-tailed Chat, *Icteria virens longicauda*, and again near Palouse Falls, in southeastern Washington, on June 18, 1878, in a nest of the Slate-colored Sparrow, *Passerella iliaca schistacea*. This I believe is the most western breeding record known.

Both of these specimens are now in the United States National Museum collection.

The most southern breeding records I have knowledge of are from Wayne and McIntosh counties, Georgia; Petite Anse Island, Louisiana, and Harris County, Texas. It does not appear to breed anywhere in the immediate vicinity of the Gulf coast in Texas, where it is replaced by its smaller relative, the Dwarf Cowbird. While the majority of these birds pass beyond our borders in the late fall and winter, mainly to southern Mexico, still a good many remain in our Southern States, and a few even winter occasionally as far north as New England, Michigan, etc.

Dr. G. Brown Goode tells me that while on the German Lloyd steamer *Neckar*, in April, 1880, a Cowbird flew on board, fully 1,000 miles east of Newfoundland, and was captured.

The Cowbird ordinarily arrives in good-sized flocks in the Middle States, from its winter home in the South, during the last half of March; in the more northern States, rarely before the first week in April, and more frequently after the middle of this month, the males predominating in numbers over the more plainly colored females, and generally precede them several days. Soon after, these flocks commence to break up and scatter in small companies of from six to twelve individuals and disperse generally over the country. It prefers more or less cultivated districts, river valleys, etc., where other birds are abundant, and rarely penetrates far into heavily timbered sections or mountainous regions, excepting in Colorado, where it has been met with at altitudes up to 8,000 feet.

The food of the Cowbird consists principally of vegetable matter, such as seeds of different kinds of noxious weeds, like ragweed, smartweed, foxtail or pigeon grass, wild rice and the smaller species of grains, berries of different kinds, as well as of grasshoppers, beetles, ticks, flies, and other insects, worms, etc. Taking its food alone into consideration it does perhaps more good than harm.

While the Cowbird is fairly common in most of the States east of the Mississippi River, it is far more noticeable in the regions west of this stream,

although perhaps not much more abundant. In the prairie States this is especially the case, and one will rarely see a bunch of cattle there without an attending flock of Cowbirds, who perch on their backs, searching for parasites, or follow them along on the ground, hunting for suitable food among their droppings. They generally act in concert; when one settles on the ground the others follow shortly afterwards, and if one starts to fly, the remainder take wing also. Their flight resembles that of the Red-winged Blackbird. When the nesting season approaches, the males become very demonstrative in their actions toward the females, but do not appear to mind the attentions paid by other males to the same female, as other birds usually do, and rarely fight for her possession. Free lovers as they are, they do not object to such trifles.

At this time of the year several males may frequently be seen perched on some fence rail or the limb of a tree, with the feathers of their throats raised, tails spread, and wings trailing, each endeavoring to pour out his choicest song to one of his prospective mates. This consists of various unreproducible guttural sounds, uttered while all the feathers are puffed out, the head lowered, and evidently produced only by considerable effort on the part of the performer. One of their call notes sounds somewhat like "spreele," others resemble the various squeaks of the Red-winged Blackbird, and all are difficult to reproduce on paper.

It is a well-known fact that the Cowbird is a parasite, building no nest, but inflicting its eggs usually on smaller birds, leaving to them the labor and care of rearing its young. It appears to be entirely devoid of conjugal affection and practices polyandry, the small flocks in which it is found during the season of reproduction generally containing several more males than females.

It is at all times more or less gregarious, especially so in the fall and winter, when it often forms large flocks, and associates then with the other Blackbirds, like Brewer's and the Red-winged.

The laying season rarely begins before May 15, and continues for about two months. During this time probably from eight to twelve eggs are laid by each female, or the equivalent of two broods, and I believe that several days elapse between the laying of the eggs. It is not likely (and this is very fortunate indeed) that more than half of these eggs are hatched, as some are occasionally dropped in old and abandoned nests, or, when the female is hard pressed, even on the ground; others in just completed nests in which the rightful owner had not yet laid, who, seeing the parasitic egg in its nest, either abandons it entirely or constructs another over the first, burying the stranger egg among the building materials.

When the Cowbird is ready to deposit her eggs, she quietly leaves her associates and begins her search for a suitable nest, usually selecting one of a species smaller than herself; but if such is not readily found, a nest of a larger bird will answer equally well, especially if the full complement of eggs has not been deposited in it. She does not forcibly drive the owner from her nest, but watches her opportunity to drop her egg in it when it is unguarded. In rare instances only will a fresh Cowbird's egg be found among incubated ones of the rightful owner. I have observed this only on a single occasion. From one to seven of these

parasitic eggs have been found in a nest, the larger numbers usually in those of ground-building species, especially in that of the Ovenbird, where from three to five, with perhaps two or three eggs of the owner, are not especially uncommon. I know of one instance where not less than seven Cowbird's eggs were found in a nest of this species with a single one of its own. Not infrequently two or more eggs (in all probability laid by the same bird) will be found in one nest. There is so much variation in their eggs, both in size and markings, that the close resemblance of any two eggs at once attracts attention. It is not unusual to find some of the eggs of the rightful owner thrown out of the nest to make room for those of the parasite, or to find minute punctures in the shells of some of the remaining eggs. This is possibly done purposely by the Cowbird with her beak or with her sharp claws while sitting on the nest and depositing her own egg, to keep the eggs from hatching. I am inclined to attribute this puncturing to the latter cause, but there is no doubt that the Cowbird sometimes throws the eggs of the rightful owner out of the nest purposely to enhance the chances of its offspring coming to maturity. I have yet to see a punctured Cowbird's egg. It is astonishing how many different species are thus imposed upon by the Cowbird. One would naturally suppose that birds breeding in holes in trees or under rocks would be exempt from this infliction, but this is not the case. Perhaps among the strangest and most unlikely of foster parents selected are the Red-headed Woodpecker and the Rock Wren.

Mr. William G. Smith, formerly of Loveland, Colorado, writes me that he found a Cowbird's egg in a Rock Wren's nest, under a ledge of rock, fully 2 feet from the entrance, which was barely large enough for the Wren to squeeze through. It seems almost impossible that a bird of this size would be able to enter the small, pendent nest of the Parula Warbler and deposit its egg therein in the usual way. However, as this species is occasionally imposed on, it is possible that the egg is dropped in the nest with the beak.

The following is a list of species in whose nests eggs of the Cowbird have been found, and undoubtedly a number of others yet remain to be added to it:

*Zenaidura macroura*, Mourning Dove.
*Coccyzus americanus*, Yellow-billed Cuckoo.
*Melanerpes erythrocephalus*, Red-headed Woodpecker.
*Tyrannus tyrannus*, Kingbird.
*Sayornis phœbe*, Phœbe.
*Contopus virens*, Wood Pewee.
*Empidonax acadicus*, Arcadian Flycatcher.
*Empidonax pusillus*, Little Flycatcher.
*Empidonax pusillus traillii*, Traill's Flycatcher.
*Empidonax minimus*, Least Flycatcher.
*Otocoris alpestris praticola*, Prairie Horned Lark.
*Dolichonyx oryzivorus*, Bobolink.
*Xanthocephalus xanthocephalus*, Yellow-headed Blackbird.
*Agelaius phœniceus*, Red-winged Blackbird.
*Sturnella magna*, Meadow Lark.
*Sturnella magna neglecta*, Western Meadow Lark.
*Icterus spurius*, Orchard Oriole.
*Icterus galbula*, Baltimore Oriole.
*Icterus bullocki*, Bullock's Oriole.
*Scolecophagus cyanocephalus*, Brewer's Blackbird.
*Carpodacus purpureus*, Purple Finch.
*Spinus tristis*, American Goldfinch.
*Calcarius ornatus*, Chestnut-collared Longspur.
*Rhynchophanes mccownii*, McCown's Longspur.
*Poocætes gramineus*, Vesper Sparrow.

*Poocætes gramineus confinis*, Western Vesper Sparrow.
*Chondestes grammacus*, Lark Sparrow.
*Chondestes grammacus strigatus*, Western Lark Sparrow.
*Zonotrichia leucophrys*, White-crowned Sparrow.
*Spizella socialis*, Chipping Sparrow.
*Spizella pusilla*, Field Sparrow.
*Spizella pallida*, Clay-colored Sparrow.
*Junco hyemalis*, Slate-colored Junco.
*Melospiza fasciata*, Song Sparrow.
*Melospiza fasciata montana*, Mountain Song Sparrow.
*Melospiza georgiana*, Swamp Sparrow.
*Passerella iliaca schistacea*, Slate-colored Sparrow.
*Pipilo erythrophthalmus*, Towhee.
*Cardinalis cardinalis*, Cardinal.
*Habia ludoviciana*, Rose-breasted Grosbeak.
*Guiraca cærulea*, Blue Grosbeak.
*Passerina cyanea*, Indigo Bunting.
*Passerina amœna*, Lazuli Bunting.
*Passerina ciris*, Painted Bunting.
*Spiza americana*, Dickcissel.
*Calamospiza melanocorys*, Lark Bunting.
*Piranga erythromelas*, Scarlet Tanager.
*Piranga rubra*, Summer Tanager.
*Petrochelidon lunifrons*, Cliff Swallow.
*Ampelis cedrorum*, Cedar Waxwing.
*Vireo olivaceus*, Red-eyed Vireo.
*Vireo gilvus*, Warbling Vireo.
*Vireo flavifrons*, Yellow-throated Vireo.
*Vireo solitarius*, Blue-headed Vireo.
*Vireo noveboracensis*, White-eyed Vireo.
*Vireo belli*, Bell's Vireo.
*Mniotilta varia*, Black and White Warbler.
*Protonotaria citrea*, Prothonotary Warbler.
*Helmitherus vermivorus*, Worm-eating Warbler.
*Helminthophila pinus*, Blue-winged Warbler.
*Helminthophila chrysoptera*, Golden-winged Warbler.
*Helminthophila ruficapilla*, Nashville Warbler.
*Compsothlypis americana*, Parula Warbler.
*Dendroica æstiva*, Yellow Warbler.
*Dendroica cærulescens*, Black-throated Blue Warbler.
*Dendroica cærulea*, Cerulean Warbler.
*Dendroica blackburniæ*, Blackburnian Warbler.
*Dendroica virens*, Black-throated Green Warbler.
*Dendroica discolor*, Prairie Warbler.
*Seiurus aurocapillus*, Ovenbird.
*Seiurus noveboracensis*, Water Thrush.
*Seiurus motacilla*, Louisiana Water Thrush.
*Geothlypis formosa*, Kentucky Warbler.
*Geothlypis trichas*, Maryland Yellowthroat.
*Geothlypis trichas occidentalis*, Western Yellowthroat.
*Icteria virens*, Yellow-breasted Chat.
*Icteria virens longicauda*, Long-tailed Chat.
*Sylvania mitrata*, Hooded Warbler.
*Setophaga ruticilla*, American Redstart.
*Galeoscoptes carolinensis*, Catbird.
*Harporhynchus rufus*, Brown Thrasher.
*Salpinctes obsoletus*, Rock Wren.
*Troglodytes ædon*, House Wren.
*Parus bicolor*, Tufted Titmouse.
*Polioptila cærulea*, Blue-gray Gnatcatcher.
*Turdus mustelinus*, Wood Thrush.
*Turdus fuscescens*, Wilson's Thrush.
*Turdus ustulatus swainsonii*, Olive-backed Thrush.
*Turdus aonalaschkæ auduboni*, Audubon's Hermit Thrush.
*Merula migratoria*, American Robin.
*Sialia sialis*, Bluebird.

Among the birds mentioned above the nests of the Phœbe, Song Sparrow, Towhee, Indigo Bunting, Ovenbird, and Yellow-breasted Chat seem to be most frequently selected by the Cowbird, and these usually contain also more of the parasitic eggs than the majority of the others.

The egg of the Cowbird usually hatches in from ten to eleven days, generally in advance of those of the foster parent, and the growth of the young interloper is rapid. Mr. M. A. White, of Mathews, Virginia, whose observations correspond fairly well with my own, writes on this subject as follows:

"It was on the 9th of June, 1891, that I placed a fresh egg of the Cowbird in the nest of a Chipping Sparrow containing two of her own that had an advance of one and a half days' incubation. I watched results. About the 19th

Mr. Cowbird emerged from his prison walls, large and vigorous. A day later a little sparrow came forth from his delicate shell, but much smaller, and exhibiting less strength than his foster brother. The other egg failed to hatch.

"The daily increase in size of the Cowbird was something immense, while his younger companion seemed to diminish rather than enlarge, until finally, at the end of three days, he died, evidently for want of food, as the Cowbird, being larger, greedily devoured everything that came in contact with his capacious mouth. The untimely end of the rightful heir was but gain to this usurper, as he now received the whole attention of the parent birds. Nature having now, at the early age of seven days, provided him with a respectable dress, he was no longer contented to remain within the small compass of the nest, and he took to the branches of the tree in which the nest had been placed. But soon this area became too limited for his ambitious spirit, for at the end of his second week he was flitting from bush to bush, exploring the fields and hedges, his foster parents providing for him all the while. Two weeks more and he was a full-fledged bird. About July 20 I saw him for the last time."[1]

Such seems to be the fate of nearly all the young which have the misfortune to be hatched with a Cowbird for a companion. I have yet to see a nest containing young birds of both species more than a few days old; by that time the rightful offspring are either smothered or crowded out of the nest by their stronger foster brother, or they are starved, and he then absorbs the entire attention of the parents. Only in cases where the true offspring is as large or larger than the imposter is there any likelihood of exception to this rule. It can readily be seen what an immense amount of harm a Cowbird causes in the economy of nature, granting that only a single one of its eggs is hatched in a season. A brood of insectivorous and useful birds is almost invariably sacrificed for every Cowbird raised, and they are certainly not diminishing in numbers.

While a few of the selected foster parents resent the addition of a parasitic egg in their nest, either by abandoning it entirely or by building a new one over it, and occasionally even a third one, the majority do not appear to be much disturbed by such an event, and after a short time go on as if nothing had happened. A few species, like the Indigo Bunting for instance, will sometimes abandon their own eggs should the stranger egg be removed, but apparently do not mind the loss of one or two of their own, and continue incubating just the same.

Almost invariably the nest in which one or more of these parasitic eggs have been deposited contains an incomplete set of the eggs of its rightful owners. Where the Cowbird drops an egg in the nest of a species considerably smaller than itself, as the Gnatcatcher, etc., its much larger size seems to be a positive advantage to the more rapid development of the embryo, as the egg must necessarily receive more animal heat than the smaller ones, which can scarcely come much in contact with the body of the sitting bird, and the development of the embryos in these must be more or less retarded thereby.

[1] The Oologist, Vol. X, Aug., 1893, pp. 230, 231.

It is ludicrous to see a fat, fully fledged young Cowbird following a pair of Chipping Sparrows, or some small Warbler, clamoring incessantly for food, and uttering its begging call of "seerr-seerr" most persistently, only keeping quiet while its gaping beak is filled with some suitable morsel, and stranger still to note how devoted the diminutive nurses are to their foster child. One would think that they might see through the fraud, at least after the young interloper leaves the nest, if not before, and abandon him to his fate; but the greatest attachment seems to exist between them until the Cowbird is able to shift for himself, when he leaves and joins his own kind.

It has been asserted that Cowbirds occasionally build nests and rear their own young in the West, but this is undoubtedly incorrect, and on proper investigation it will probably be found that the supposed Cowbird is really Brewer's Blackbird.

When the laying season is over they collect again in larger flocks and frequent the marshes, in company with the Blackbirds, where at that time of the year they find an abundance of food, and the return migration to their winter homes begins usually in the latter half of October.

The shell of the Cowbird's egg is compact, granulated, moderately glossy, and relatively much stronger than that of its near allies, the *Icteridæ*. The ground color varies from an almost pure white to grayish white, and less often to pale bluish or milky white, and the entire surface is usually covered with specks and blotches varying in color from chocolate to claret brown, tawny, and cinnamon rufous. In an occasional specimen the markings are confluent and the ground color is almost entirely hidden by them; in the majority, however, it is distinctly visible. These markings are usually heaviest about the larger end of the egg, and in rare instances they form an irregular wreath. The eggs vary greatly in shape, ranging from ovate to short, rounded, and elongate ovate, the first predominating.

The average measurement of one hundred and twenty-seven specimens in the United States National Museum collection is 21.45 by 16.42 millimetres, or 0.84 by 0.65 inch; the largest egg measures 25.40 by 16.76 millimetres, or 1 by 0.66 inch; the smallest, 18.03 by 15.49 millimetres, or 0.71 by 0.61 inch.

The type specimen, No. 20157 (Pl. 6, Fig. 3), represents one of the lighter-marked types, and was taken by the writer near St. Louis, Missouri, on June 24, 1873, from a nest of the Yellow-breasted Chat; this contained three other eggs, one of which was deposited by the Cowbird and two by the other species. No. 20160 (Pl. 6, Fig. 4), also from the Bendire collection, represents one of the more finely spotted eggs of this species. It was taken from a nest of the Mountain Song Sparrow, in El Paso County, Colorado, on July 2, 1874; this also contained another Cowbird's egg and three eggs of the rightful owner. Both of these are large specimens. No. 25463 (Pl. 6, Fig. 5) represents an average-sized and a heavily marked specimen in which the ground color is pretty well hidden, and was taken by Dr. A. K. Fisher, near Sing Sing, New York, from a nest of the Red-eyed Vireo, containing two eggs of its own in addition to that of the parasite, on June 6, 1880; and No. 25721 (Pl. 6, Fig. 6), in the

Ralph collection, represents one of the smaller-sized specimens, with lighter-colored markings, and was taken near Holland Patent, New York, on May 31, 1884, from a nest of a Phœbe containing four of its own eggs and two of those of the Cowbird. The two last named were evidently both laid by the same bird.

## 171. Molothrus ater obscurus (Gmelin).

DWARF COWBIRD.

*Sturnus obscurus* Gmelin, Systema Naturæ, I, ii, 1788, 804.
*M[olothrus] ater* var. *obscurus* Coues, Birds of the Northwest, 1874, 180, in text.
(B —, C 211*a*, R 258*a*, C 314, U 495*a*.)

Geographical range: Mexico and adjoining portions of the United States from southern Texas to southwestern Arizona and Lower California.

The breeding range of the Dwarf Cowbird in the United States is coincident with its geographical distribution. It can only be considered a summer resident in southern Arizona, although a few appear to winter there, as I shot an adult male on Rillito Creek, near Tucson, on January 24, 1873. It usually arrives from its winter home in southern Mexico about the middle of March, and is then found associating with different species of Blackbirds, especially Brewer's Blackbird, frequenting the vicinity of cattle ranches, roads, and cultivated fields. By April 15 the flocks have scattered, and small parties of from five to twelve may now be seen in suitable localities, such as the shrubbery along water courses, springs, etc., where other small birds are abundant. The character of its food, and its general habits as well, are similar to those of the common Cowbird, which it closely resembles, being only a trifle smaller. In middle Texas the two races intergrade to some extent, and it is claimed both breed there. In the lower Rio Grande Valley, Texas, the typical Dwarf Cowbird is common, and I found it equally so in the vicinity of Tucson, Arizona, where I have taken quite a number of its eggs.

Mr. F. Stephens writes me that it is a common summer resident as far west as the Colorado River, beyond the immediate vicinity of which he has never seen it. Mr. L. Belding found it common in the streets of San Jose del Carbo, Lower California, associating with Brewer's Blackbirds, during April. but he rarely saw it later. It is questionable if it breeds there.

Like its eastern relative, the Dwarf Cowbird drops its eggs in the nests of other birds, principally in those of species which are smaller than itself. The following is a list of those in which they have thus far been found:

*Contopus richardsoni*, Western Wood Pewee.
*Pyrocephalus rubineus mexicanus* Vermilion Flycatcher.
*Agelaius phœniceus*, Red-winged Blackbird.
*Icterus cucullatus*, Hooded Oriole.
*Icterus cucullatus nelsoni*, Arizona Hooded Oriole.
*Icterus spurius*, Orchard Oriole.
*Icterus bullocki*, Bullock's Oriole.
*Chondestes grammacus strigatus*, Western Lark Sparrow.
*Amphispiza bilineata*, Black-throated Sparrow.
*Peucæa carpalis*, Rufous-winged Sparrow.

*Melospiza fasciata fallax*, Desert Song Sparrow.
*Embernagra rufivirgata*, Texas Sparrow.
*Piranga rubra cooperi*, Cooper's Tanager.
*Cardinalis cardinalis canicaudus*, Gray-tailed Cardinal.
*Sporophila morelleti sharpii*, Sharpe's Seed-eater.
*Vireo noveboracensis*, White-eyed Vireo.
*Vireo bellii*, Bell's Vireo.
*Vireo bellii pusillus*, Least Vireo.
*Helminthophila luciæ*, Lucy's Warbler.
*Dendroica æstiva sonorana*, Sonora Yellow Warbler.
*Dendroica chrysoparia*, Golden-cheeked Warbler.
*Geothlypis trichas occidentalis*, Western Maryland Yellowthroat.
*Icteria virens longicauda*, Long-tailed Chat.
*Mimus polyglottus*, Mockingbird.
*Polioptila plumbea*, Plumbeous Gnatcatcher.
*Sialia mexicana*, Western Bluebird.

Doubtless a number of other names still remain to be added.

According to my observations, the Least Vireo seems to be oftener imposed upon, in southern Arizona at least, than any other bird, the Desert Song Sparrow, Black-throated Sparrow, and Vermilion Flycatcher following in the order named.

The earliest date known by me on which an egg of this subspecies was found is April 18, the latest August 2, showing that the laying season lasts apparently considerably longer than with *Molothrus ater*, and it appears to be at its height during the month of June.

I found it almost impossible to obtain a full set of the eggs of the Least Vireo, nearly every nest containing one or two eggs of this parasite, and usually only one or two of its own, and the latter were frequently punctured. In fact, this was so often the case that I am inclined to believe that it is done purposely and not by accident; but whether made by the beak or the claws of the bird I will not venture to say; believe, however, it is done by the latter. In many nests I found one or two of the owners' eggs thrown out and broken, and occasionally every one, the foster parent sitting on the parasite's eggs alone. Among other instances I found this to be the case in a nest of the Plumbeous Gnatcatcher, which was placed in a thick mistletoe bunch growing from a limb of a mesquite tree, about 15 feet from the ground and well hidden. I first observed the nest on June 10, 1872, when it contained a single egg; on visiting it again on the 17th the female was sitting on a couple of Dwarf Cowbird's eggs alone, and on looking on the ground I found the remnants of three eggs, which evidently had been thrown out. Bullock's Oriole may occasionally rid herself of the parasitic egg; at any rate I noticed the remains of one lying under a nest of this species, with portions of one of her own. This nest contained only three eggs of the rightful owner, and the bird was sitting on these. The largest number of Dwarf Cowbird's eggs found by me in one nest was three, that of a Desert Song Sparrow, and all of its own eggs were missing. I several times found nests containing single eggs of this parasite abandoned, and also picked up two uninjured from the ground, where they evidently had been dropped by the bird, not finding a suitable nest in time to deposit them. None of the young of the foster parents seem to survive the advent of a young Cowbird in their nest longer than two or three days, as they are soon starved by their more vigorous and voracious foster brother. After the young Dwarf Cowbird is old enough to care for itself it abandons its

foster parents and seeks the company of its own kind, which gather in small bands and rove from place to place. Later in the season, about the latter part of October, these gather into larger flocks, associating at this time with other congenial species, and shortly after they return to their winter homes in Mexico.

In general appearance and shape the eggs of the Dwarf Cowbird resemble those of the preceding species, and the same description will answer for both; but they appear on an average to be somewhat less heavily spotted, which gives them a lighter appearance, and they are also considerably smaller.

The average measurement of thirty-seven specimens in the United States National Museum collection is 19.30 by 14.99 millimetres, or 0.76 by 0.59 inch. The largest egg in this series measures 20.57 by 15.49 millimetres, or 0.81 by 0.61 inch; the smallest, 18.03 by 13.74 millimetres, or 0.71 by 0.54 inch.

The type specimens, No. 20178 and 20179 (Pl. 6, Figs. 7 and 8), both in the Bendire collection, were taken by the writer on Rillito Creek, near Tucson, Arizona, the first and smaller on June 20, 1872, from a nest of the Black-throated Sparrow, with only a single egg of its own, incubation having commenced; the second, on July 19,1872, from a nest of the Least Vireo, containing also two of its own eggs, which were fresh. They represent about the usual amount of markings, and the last-mentioned specimen is above the average size.

## 172. Callothrus robustus (Cabanis).

RED-EYED COWBIRD.

*Psarocolinus aneus* Wagler, Isis, 1829, 758.
*Callothrus robustus* Ridgway, Manual of North American Birds, 1887, 589.
(B —, C —, R 259, C 315, U 496.)

Geographical range: Mexico and Central America, north to southern Texas, south to Panama.

The breeding range of the Red-eyed or Bronzed Cowbird, a larger and darker-colored species than the two preceding, coincides with its geographical distribution in the United States, and extends, as far as known, northward and eastward only to Bexar County, Texas, where Mr. H. P. Attwater reports it as a rare summer resident near San Antonio, and where he found one of its eggs in the nest of a Bullock's Oriole.

We are indebted to Dr. James C. Merrill, United States Army, for the addition of this interesting species to our fauna. He first recorded it in the Bulletin of the Nuttall Ornithological Club (Vol. I, 1876, p. 88), as an abundant summer resident in the vicinity of Fort Brown, Texas. A full account of the breeding habits of this species by Dr. Merrill may be found in the above-mentioned Bulletin (Vol. II, 1877, pp. 85–87), from which I extract the most interesting notes:

"My first specimens were taken at Hidalgo, on the Rio Grande, 70 miles northwest of Fort Brown, where, however, they are not so abundant as lower down the river. Here they are common throughout the year, a small propor-

tion going south in winter. Those that remain gather in large flocks with the Long-tailed Grackles, common Cowbirds, and Brewer's, Red-winged, and Yellow-headed Blackbirds; they become very tame, and the abundance of food about the picket lines attracts them for miles around. *Callothrus robustus* is readily distinguishable in these mixed gatherings from the other species by its blood-red iris and its peculiar top-heavy appearance, caused by its habit of puffing out the feathers of the head and neck. This habit is most marked during the breeding season and in the male, but is seen throughout the year.

"About the middle of April the common Cowbird and Brewer's and the Yellow-headed Blackbirds leave for the north; the Long-tailed Grackles have formed their colonies in favorite clumps of mesquite trees; the Redwings that remain to breed have selected sites for their nests; the Dwarf Cowbirds, *Molothrus pecoris obscurus*, arrive from the south, and *Callothrus robustus* gather in flocks by themselves and wait for their victims to build. The males have now a variety of notes, somewhat resembling those of the common Cowbird, *Molothrus pecoris*, but more harsh. During the day they scatter over the surrounding country in little companies of one or two females and half a dozen males, returning at nightfall to the vicinity of the picket lines. While the females are feeding or resting in the shade of a bush the males are eagerly paying their addresses by puffing out their feathers, as above noted, strutting up and down, and nodding and bowing in a very odd manner. Every now and then one of the males rises in the air, and, poising himself two or three feet above the female, flutters for a minute or two, following her if she moves away, and then descends to resume his puffing and bowing. This habit of fluttering in the air was what first attracted my attention to the species. In other respects their habits seem to be like those of the eastern Cowbird (*Molothrus pecoris*).

"My first egg of *Callothrus robustus* was taken on May 14, 1876, in a Cardinal's nest. A few days before this a soldier brought me a similar egg, saying he found it in a Scissors-tail's (*Milvulus*) nest. Not recognizing it at the time, I paid little attention to him, and did not keep the egg. I soon found several others, and have taken in all twenty-two specimens the past season. All but two of these were found in nests of the Bullock's, Hooded, and Orchard Orioles. It is a curious fact that although Yellow-breasted Chats and Red-winged Blackbirds breed abundantly in places most frequented by these Cowbirds, I have but once found the latter's egg in a Chat's nest, and never in a Redwing's, though I have looked in very many of them. Perhaps they feel that the line should be drawn somewhere, and select their cousins, the Blackbirds, as coming within it. The Dwarf Cowbirds are not troubled by this scruple, however. Several of these parasitic eggs were found under interesting conditions. On six occasions I have found an egg of both Cowbirds in the same nest. In four of these there were eggs of the rightful owner,[1] who was sitting. In the other two the Cowbird's eggs were alone in the nests, which were deserted. But I have known the

[1] It would be interesting to know what would have become of the three species in one nest, and had the latter been near the fort, where I could have visited them daily, I should not have taken the eggs. It is probable, however, that *Callothrus robustus* would have disposed of the young Dwarf Cowbird as easily as of the young Orioles.

Hooded Oriole to set on an egg of *Callothrus robustus* which was on the point of hatching when found. How its own disappeared I can not say. Once two eggs of *Callothrus robustus* were found in a nest of the small Orchard Oriole (var. *affinis*). Twice I have seen a broken egg of *Callothrus robustus* under nests of Bullock's Oriole on which the owner was sitting.

"Early in June a nest of the Hooded Oriole was found, with four eggs, and one of *Callothrus robustus*, all of which I removed, leaving the nest. Happening to pass by it a few days later, I looked in, and to my surprise found two eggs of *robustus*, which were broken. These were so unlike that they were probably laid by different birds. Still another egg, and the last, was laid in the same nest within ten days. But the most remarkable instance was a nest of the small Orchard Oriole found June 20, containing three eggs of *Callothrus robustus*, while just beneath it was a whole egg of this parasite; also a broken one of this and the Dwarf Cowbirds *Molothrus obscurus*. Two of the eggs in the nest were rotten. The third, strange to say, contained a living embryo. As the nest was certainly deserted, I can only account for this by supposing that the two rotten ones were laid about the first week of June, when there was considerable rain, and that the other was deposited soon after, since which time the weather had been clear and very hot. On one occasion I found a female *Callothrus robustus* suspended from a nest of the Bullock's Oriole by a stout thread around its neck. The nest contained one young of this Cowbird, and it is probable that its parent, after depositing the egg, became entangled in the thread on hurriedly leaving the nest, and there died. It had apparently been dead about two weeks. This case supports the view that the eggs or young of the owner are thrown out by the young parasite and not removed by its parent, though I could find no trace of them beneath the nest."

Among the species imposed on by the Red-eyed Cowbird are the following:

*Milvulus forficatus*, Scissor-tailed Flycatcher.
*Icterus audubonii*, Audubon's Oriole.
*Icterus cucullatus*, Hooded Oriole.
*Icterus spurius*, Orchard Oriole.
*Icterus bullocki*, Bullock's Oriole.
*Cardinalis cardinalis canicaudus*, Gray-tailed Cardinal.
*Guiraca cærulea eurhyncha*, Western Blue Grosbeak.
*Icterus virens longicauda*, Long-tailed Chat.

Other species will undoubtedly have to be added to this list.

The Orioles appear to be the special victims of the Red-eyed Cowbird, and among these Audubon's seems to be the worst sufferer. In nine sets of this species in the United States National Museum collection there are only two which contain the normal number of eggs, four. In each of the other seven there are from one to three of those parasitic eggs, with one or two of their owners', and usually some of these are punctured. In none of these nests were eggs of the Dwarf Cowbird found in addition to those of the *Callothrus robustus*. The former appears to deposit its eggs in nests of the smaller Orioles only.

The eggs of the Red-eyed Cowbird are rather glossy; the shell is finely granulated and strong. Their shape varies from ovate to short and rounded

ovate. They are pale bluish green in color and unspotted, resembling the eggs of the Black-throated Sparrow and Blue Grosbeak in this respect, but are much larger.

The average measurement of thirty-eight specimens in the United States National Museum collection is 23.11 by 18.29 millimetres, or 0.91 by 0.72 inch. The largest egg of the series measures 24.64 by 18.80 millimetres, or 0.97 by 0.74 inch; the smallest, 21.84 by 16.76 millimetres, or 0.86 by 0.66 inch.

The type specimen, No. 26349 (Pl. 6, Fig. 9), from the Ralph collection, taken from a nest of Audubon's Oriole containing three eggs and also three of the Red-eyed Cowbird's, was obtained on May 8, 1893, in Cameron County, Texas, and represents about an average egg of this species.

## 173. Xanthocephalus xanthocephalus (Bonaparte).

YELLOW-HEADED BLACKBIRD.

*Icterus xanthocephalus* Bonaparte, Journal Academy Natural Sciences, Phila., V, 1826, 223.
*Xanthocephalus xanthocephalus* Jordan, Manual of Vertebrates, ed. 4, 1884, 92.
(B 404, C 213, R 260, C 319, U 497.)

Geographical range: Western North America; from northern Mexico and Lower California, through Texas, New Mexico, Arizona, and California, north to southern British Columbia, and in the interior of the Dominion of Canada, in the Provinces of Athabasca and Keewatin, to about latitude 58° 30′ N.; east to Manitoba, and in the United States regularly to Wisconsin, northern Illinois, northwestern Indiana, Missouri, and the Indian Territory. Casually to Ontario and Quebec, Canada, Pennsylvania, New York, the New England States, the District of Columbia, South Carolina, Florida, and Louisiana. Accidental in the Island of Cuba and in Greenland.

The breeding range of the Yellow-headed Blackbird is, I believe, coextensive with its regular geographical distribution, although we have no positive information that it breeds in Texas and in the Indian Territory. It is a well-known and abundant winter resident, however, along the Gulf coast and in the lower Rio Grande Valley, in Texas, and it has been observed there up to the latter part of April. In looking over the series of eggs of this species I find that the United States National Museum contains a set of three, originally part of Dr. Berlandier's collection, made in the vicinity of Matamoras, Mexico, and received from Lieutenant Couch, in 1858, which, although in a poor state of preservation, can readily be identified as belonging to this bird. But in the almost impenetrable tangle and undergrowth with which many of the lagoons in that section of country are surrounded, which localities are mainly resorted to by these birds during the breeding season, it is an easy matter to overlook even such extensive colonies as are occasionally found at that time of year on its regular breeding grounds farther north, and I therefore believe that it will yet be found nesting in Texas.

The Yellow-headed Blackbird, while common in suitable localities during the breeding season throughout portions of our Northern and Western States, is

entirely absent in many others. It is a bird of the prairies, especially such as are covered here and there with lakes, sloughs, and extensive marshes, and avoids the more arid desert tracts, extensive forests, and timber-covered mountain ranges, although in Colorado it has been observed in summer at altitudes up to 9,000 feet.

Besides the numerous localities mentioned in previous works on this subject, Dr. E. A. Mearns, United States Army, found it breeding in large numbers at Mormon Lake, in the Mogollon Mountains in Arizona. Mr. A. W. Anthony reports it as common throughout the summer in southwestern New Mexico. It is exceedingly common in the vicinity of Fort Bidwell, California, among the tules of Goose Lake, and, if possible, still more so along the low, marshy shores of Lakes Malheur and Harney, in southeastern Oregon, where I have seen it in immense numbers and examined many nests. It is likewise very common along the shores of Klamath Lake, and especially in the extensive Klamath marshes. I have also noticed it in different parts of Nevada, Idaho, and Washington, and, in fact, it seems to be generally distributed in favorable localities throughout the entire Northwest, excepting perhaps in the immediate vicinity of the seashore. Along the shores of the numerous lakes in Manitoba and Saskatchewan it seems to be equally common. Mr. R. MacFarlane forwarded a nest and a set of eggs from Cumberland House, Saskatchewan, and a skin from the Hudson Bay Post at Du Brochet, situated at the northern extremity of Reindeer Lake, in about latitude 58° 30′ and longitude 101° west of Greenwich, where it is said to be a moderately common summer resident. This locality marks, as far as is yet known, the most northern point of its range.

The Yellow-headed Blackbird is eminently sociable in its habits, scarcely ever seen singly, and usually breeds in large colonies. It is apparently, however, not very tolerant toward the other species of Blackbirds which frequent similar localities, and therefore rarely nests near or among them. Its notes are harsh and rasping, and when a colony of these birds is disturbed on its breeding grounds by an unwelcome intruder, and gives vent to its displeasure, the noise and commotion produced are something startling. The male, when at ease and clinging to some swaying reed or rice stalk, often indulges in a sort of song, turning and twisting its head in all sorts of unusual positions during this performance; but with all these efforts he does not succeed in uttering much else than a series of utterly indescribable squeaks. Its ordinary call note is a shrill "chäck, chäck."

It usually arrives on its breeding grounds in our Northern States during the first half of April, and correspondingly later farther north.

The food of the Yellow-headed Blackbird consists of various kinds of small seeds, such as wild rice, etc., and in farming districts it occasionally does some damage to young corn, as well as to corn in the milk, and to oat and wheat fields. This is more than compensated for, however, by the immense number of insects, including their eggs and larvæ, which it destroys, especially young locusts and grasshoppers. In the spring and fall flocks of these birds may be seen following

the plow, cleaning up everything as they go. I believe that, on the whole it does far more good than harm.

Mr. B. T. Gault writes me: "In northeastern Illinois the marshes of the Calumet and Fox Lake regions used to be favorite resorts of these birds. I have always found them nesting in the tall wild rice growing abundantly in these localities. Each nest was attached to several such stalks, at a height of 2 or 3 feet above the surface of the water, and usually in a place where it was almost out of the question to use a boat to good advantage and quite dangerous if not impossible to wade."

Mr. J. W. Preston makes the following remarks: "These birds swarm in the numerous swamps of northwestern Iowa. In one small tract of water cane I have seen over a thousand nests built among the stalks, and sometimes so closely as to touch each other. These nests are cunningly woven into clumps of last season's cane, and are choice bits of bird architecture. The materials utilized are old blades of sedges and grasses brought from shallow water and used wet. I have concealed myself among them and watched the female gathering the materials, which she does in a leisurely manner, discarding such as do not suit her. The nest is placed from 6 inches to 3 feet above the water."

Among the extensive tule marshes bordering Malheur Lake, Oregon, I have seen hundreds of these birds nesting. Here the nests were all securely fastened to several tall tule stems, or to rushes from 10 to 30 inches above the water level. Some resembled inverted cones, and measured as much as 8 or 10 inches in outer depth; the majority, however, were not nearly so deep. A well-preserved nest now before me, No. 20233, United States National Museum collection, taken on June 3, 1876, near Malheur Lake, measures exteriorly 5 inches in depth by $5\frac{1}{2}$ inches in outer diameter. The inner cup is $2\frac{1}{2}$ inches deep by $2\frac{3}{4}$ inches in diameter. The outside of the nest is composed of coarse marsh grasses and pieces of tule reeds and rushes, which are woven together while wet, but no mud is used to bind these materials together; the inner cup is lined with finer grasses, these being utilized in a dry state. The nest, although large and bulky, with walls over an inch thick, is quite light, but still strong and durable enough to withstand the heavy gales which occasionally sweep over these shallow inland lakes. I have seen only the female building, and doubt if the male assists to any great extent in this labor, but he does not abandon his mate during the season of incubation, as I have seen it stated; for, although he may not assist in these duties, he is never far away. It takes about a week to build a nest, and they are frequently not used for a week or more after being finished. In the more southern parts of its breeding range nidification usually begins during the last ten days in May, and is at its height by the middle of June, while in Saskatchewan and still farther north it is protracted to the latter part of this month. Mr. R. MacFarlane took fresh eggs in the vicinity of Cumberland House on June 30, 1890.

From two to five eggs are laid to a set, usually four; and I believe, throughout the northern parts of its range at least, only a single brood is raised in a season; an egg is deposited daily.

Incubation, as nearly as I have been able to ascertain, lasts about fourteen days, and the young are able to leave the nest in about sixteen days after hatching.

By the 1st of August the Yellow-headed Blackbirds have gathered into large flocks and then roam about in search of good feeding grounds. They fly in compact masses and at this time associate to some extent with Brewer's and the Red-winged Blackbirds. By the middle of October they gradually disappear along the northern borders of their range and move southward, wintering in our southwestern States and in northern Mexico.

The eggs of the Yellow-headed Blackbird vary in shape from ovate to elliptical and elongate ovate; the shell is finely granulated, strong, and rather glossy. The ground color varies from grayish white to pale greenish white, and this is profusely and pretty evenly blotched and speckled over the entire surface with different shades of browns, cinnamon rufous, ecru drab, and pearl gray. The markings are usually heaviest about the larger end of the egg, and sometimes a specimen is met with which shows a few fine, hair-like tracings, like those found on the eggs of the Orioles.

The average measurement of one hundred and thirty-four eggs in the United States National Museum collection is 25.83 by 17.92 millimetres, or about 1.02 by 0.71 inches. The largest egg in the series measures 28.96 by 19.81 millimetres, or 1.14 by 0.78 inches; the smallest, 23.11 by 17.53 millimetres, or 0.91 by 0.69 inch.

The type specimen, No. 20233 (Pl. 6, Fig. 10), from a set of three, was taken by the writer at Malheur Lake, near Camp Harney, Oregon, on June 3, 1876, and represents one of the coarser marked and larger eggs; Nos. 25028 and 25030 (Pl. 6, Figs. 11 and 12), both from sets of four, taken by Dr. Edgar A. Mearns, United States Army, near Fort Snelling, Minnesota, May 27, 1891, represent the finer and more common styles of markings, and show the variations in size as well, the former showing also a few hair lines which are not often found on the eggs of this species.

## 174. Agelaius phœniceus (Linnæus).

RED-WINGED BLACKBIRD.

*Oriolus phœniceus* Linnæus, Systema Naturæ, ed. 12, I, 1766, 161.
*Agelaius phœniceus* Swainson, Fauna Boreali Americana, II, 1831, 280.
(B 401, C 212, R 261, C 316, U 498.)

Geographical range: Temperate North America; north in the eastern parts of the Dominion of Canada to about latitude 49°; in the interior to Great Slave Lake and Fort Simpson, Northwest Territory to about latitude 62° N.; and on the Pacific Coast, as far as known, to southern British Columbia. South in winter to Costa Rica, Central America. Accidental in England, Italy, etc.

The breeding range of the Red-winged Blackbird, also known as the "Swamp" and "Marsh" Blackbird, is nearly coextensive with its geographical distribution both in the United States and the Dominion of Canada. It is one of

the commonest and best-known birds within our borders, breeding in all suitable localities throughout the entire country, excepting the extreme southern portions of the Florida peninsula and adjacent keys, the lower Rio Grande Valley in Texas, the lower Colorado Valley, the southern portions of Arizona, and the greater part of California west of the Sierra Nevadas, where it is replaced by closely allied forms. Beyond our northern border it breeds throughout the more temperate portions of the Dominion of Canada, attaining the most northern points of its range in the vicinity of Fort Simpson, on the Mackenzie River, and along the shores of Great Slave Lake, in the Northwest Territory; while on the Pacific Coast, as far as I am aware, it has not been noted farther north than in the southern portions of British Columbia, which seems to mark the limit of its range in this direction. Enormous flocks of these birds winter in the Southern and some of the Middle States, but the majority perhaps pass farther south, extending their migrations into Mexico, and sometimes to Costa Rica, Central America.

The Red-winged Blackbird is eminently sociable in its habits, and generally moves about in large, compact flocks, except during the breeding season, when it scatters into small colonies, and sometimes into single pairs.

It usually arrives in the Middle States about March 15, moving slowly northward, and by the last of April most of the birds are established on their breeding grounds, the males preceding the females several days.

Its favorite haunts are moist meadows adjoining the banks of small creeks and streams, boggy spring holes and ponds bordered by clumps of cat-tails, flags, rushes, and rank weeds, low islands covered with marsh grasses and a few willow and alder bushes, and particularly the large and extensive tule-bordered lakes of the interior. As the mating season arrives the males become very demonstrative in their attentions to their prospective mates, and their not unmelodious "conk-que-reeh, conk-que-reeh" may be heard in all directions. A call note like "tch-ewee, tch-ewee," an energetic "tchäck, tchäck," or "däck, däck," and a long-drawn-out, clear whistle like "zhēē-hēē, zhēē-hēē," are also frequently uttered at this time.

While the food of the Red-winged Blackbird consists to some extent of Indian corn, rice, wheat, and oats, it also feeds on many of the seeds of noxious weeds, like the ragweed and smartweed; and it destroys large numbers of cutworms and injurious insects and their larvæ. In many of the prairie States it does an immense amount of good by feeding on the myriads of locusts which overrun the country at times, as well as on their eggs when turned up by the plow. Small mollusks and newts also enter into their bill of fare, as well as wild berries in their season, and in some of the Southern States they are said to feed on the seeds of the pine. In southeastern Oregon I have seen them feed on an Ephemera locally called "May" or "salmon" fly, which makes its appearance there about June 1 in countless numbers.

While the Red-winged Blackbird undoubtedly does more or less damage in some of our farming regions—for instance, to young corn just sprouting, and

again when it is in the milk, and in the rice plantations in the South—it likewise does a great deal of good, and, excepting sections where it congregates in large numbers, it is safe to assert that the good done by it throughout the year far overbalances the harm. The young are fed almost exclusively on insects, and enormous numbers are required to feed them.

The nesting season varies somewhat in different sections of its range. In same parts of the South full sets of eggs have been found as early as the first week in April, while in others nidification begins fully a month later. In the northern half of the United States it is at its height from May 15 to June 15, and occasionally fresh eggs are found more than a month later, these probably being second broods. At Fort Resolution, on Great Slave Lake, full sets have been taken on June 7 by Messrs. Robert Kennicott and James Lockhart. In the West I found the Red-winged Blackbird common throughout Washington, Oregon, Idaho, Montana, and Nevada, and it breeds more or less abundantly in all suitable localities throughout this region.

Mr. H. P. Lawrence observed large flocks of Blackbirds, consisting of this species, the Bicolored, and Brewer's Blackbirds, near the Columbia River, below Vancouver, Washington, but they appear to become rarer near the coast. At Fort Walla Walla, Washington, a little colony nested in a swampy thicket close to the Post, at an unusually early date, April 20, 1881, and the majority of the nests contained full sets of eggs at that time, while at Camp Harney, Oregon, about 250 miles farther south, nidification began about a month later.

The nests resemble those of the preceding species in general construction, but average a trifle smaller. They are usually placed in bunches of reeds, rushes, or small bushes, from a few inches to several feet above the ground, and occasionally in a tussock of rank grass directly on the ground, mostly in swampy places close to water, and rarely any great distance away. Now and then a nest may be found placed in the forks of willow, elder, and alder bushes, from 10 to 15 feet from the ground. The nest is always securely attached to several of last year's reed and grass stems or to small branches of bushes; the materials composing it vary considerably in bulk, they are used in a wet state, and consist of different kinds of coarse marsh grass, eel grass, and strips of rotten willow and sagebrush bark, as well as of finer grasses. They are usually lined with fine grass tops, and occasionally with horsehair.

An average nest measures from $4\frac{1}{2}$ to 5 inches in outer diameter, and from $3\frac{1}{2}$ to 6 inches in depth; the inner cup is from $2\frac{1}{2}$ to 3 inches in diameter, and about the same in depth; it takes about a week to complete a nest and for it to become sufficiently dry to be used. Mr. W. E. Grover found the Red-winged Blackbirds breeding in considerable numbers on Galveston Island, Texas, the nests being generally placed in salt cedars or in Cherokee rosebushes. One of the nests sent by him to the United States National Museum collection had quite a quantity of snake exuviæ incorporated in its walls, a rather unusual building material for this species.

Mr. D. C. Beard sent me a photograph of a nest of this species taken near Flushing, Long Island, New York, which was built directly on one of the Long-billed Marsh Wren, *Cistothorus palustris;* both nests were occupied and contained eggs when taken. The Cowbird imposes occasionally on this species. The number of eggs laid to a set varies from two to six, and one is laid daily until the set is completed. Sets of three and four are most often found; in the more southern portions of its range three predominate, while farther north four are the usual complement. Sets of five are uncommon, and those of six are very rare. Only a single brood is usually reared throughout the greater portion of their range.

Incubation lasts about two weeks, and the young are able to leave the nest in about sixteen days. As soon as they are large enough to provide for themselves they gather into small companies and roam over the country. In August and September they congregate in large flocks, containing many thousands, and at which time they frequently do considerable damage in certain favorite resorts.

The eggs of the Red-winged Blackbird are mostly ovate in shape; the shell is strong, finely granulated, and moderately glossy. The ground color is usually pale bluish green, and this is occasionally more or less clouded with a pale smoke-gray suffusion. They are spotted, blotched, marbled, and streaked, mostly about the larger end, with different shades of black, brown, drab, and heliotrope purple, presenting great variation in the amount, character, and style of markings. Occasionally an entirely unspotted egg is found.

The average measurement of three hundred and eighty eggs in the United States National Museum collection is 24.80 by 17.55 millimetres, or about 0.98 by 0.69 inch. The largest egg in the series measures 27.94 by 19.05 millimetres, or 1.10 by 0.75 inches; the smallest, 20.57 by 15.75 millimetres, or 0.81 by 0.62 inch.

The type specimen, No. 15037 (Pl. 6, Fig. 13), collected by Dr. Elliott Coues near Fort Macon, North Carolina, June 12, 1869, represents an egg in which the ground color is almost hidden, while No. 20199 (Pl. 6, Fig. 14), from a set of four eggs, Bendire collection, taken by the writer on April 27, 1881, near Fort Walla Walla, Washington, represents a handsome and well-marked egg. No. 26160 (Pl. 6, Fig. 15), from a set of three eggs taken by Dr. E. A. Mearns, United States Army, near Fort Clark, Texas, on July 5, 1893, represents another type, intermediate between the two previously mentioned.

The style of markings selected for the types of *Agelaius gubernator* and *Agelaius tricolor* apply likewise to eggs of this species and would answer equally well for them.

## 175. Agelaius phœniceus sonoriensis Ridgway.

SONORAN REDWING.

*Agelaius phœniceus sonorensis* Ridgway, Manual North American Birds, 1887, 370. (B 401, part; C 212, part; R 261, part; C 316, part; U 498.[a])

Geographical range: Northern Mexico and contiguous borders of the United States, from the lower Rio Grande Valley, in Texas, and Southern Arizona west to the lower Colorado Valley, California.

The Sonoran Redwing is distinguishable from the common Red-winged Blackbird by the lighter colors of the female, its smaller bill, and its somewhat larger size. Its breeding range in the United States is confined to our extreme southern border.

Five specimens, three males and two females, now in the United States National Museum collection, taken by Dr. James C. Merrill, United States Army, at Fort Brown, Texas, are referable to this subspecies. The last two were taken on February 17 and March 19, 1877, but there are no dates on the labels attached to the males. There are also several sets of eggs in the United States National Museum collection, taken by the Doctor at the same place on May 1, 1877, which are presumably referable to this race. These are indistinguishable from those of the Red-winged Blackbirds, but as they are not absolutely identified I have not figured any of them; they average a trifle smaller.

A colony of Red-winged Blackbirds (in all probability of this subspecies) nested at the sink of the Santa Cruz River, among the flags and cat-tail rushes in the laguna, 9 miles northwest of Tucson, Arizona, in the spring of 1872, but I did not take any of their eggs, supposing them to be the common eastern Red-winged Blackbird, which they closely resemble in all their habits and actions. They appear to be resident there, as I noticed some at all seasons of the year around my camp on Rillito Creek, which they often visited, in company with other birds, picking up scattered grain at the picket line to which my horses were tied at night.

There are no positively identified eggs of this subspecies in the United States National Museum collection, but they undoubtedly resemble those of the Red-winged Blackbird so closely as to be practically indistinguishable.

## 176. Agelaius phœniceus bryanti Ridgway.

BAHAMAN REDWING.

*Agelaius phœniceus bryanti* Ridgway, Manual North American Birds, 1887, 370. (B 401, part; C 212, part; R 261, part; C 316, part; U 498*b*.)

Geographical range: The Bahama Islands, West Indies, the southern portions of the Florida peninsula and the adjacent keys; west casually? to the Gulf coast of Louisiana (Lake Borgne); south to Yucatan and Nicaragua, Central America.

The breeding range of the Bahaman Redwing in the United States extends through the southern portions of the Florida peninsula (the Everglades) and the

adjacent keys, north, as far as known, to Matanzas Inlet, and possibly along the Gulf coast to Louisiana.

There is a specimen in the United States National Museum collection, taken at Lake Borgne, Louisiana, showing all of the characteristics of this race, which is distinguishable from the common Red-winged Blackbird by its larger and sharper bill and smaller size. First Lieut. Wirt Robinson, Fourth Artillery, United States Army, found this subspecies breeding abundantly at Matanzas Inlet, and secured several skins which are referable to it.

Mr. C. J. Maynard, in his Birds of Florida, describes the habitat and nesting habits of the Bahaman Redwing as follows:

"The widespread marshes of the Everglades of Florida are covered with a luxuriant growth of tall grass, which attains to the height of 5 or even 6 feet. These vast plains form the homes of hundreds of Red-winged Blackbirds, and there they also breed. As the grass is submerged in at least a foot of water in the spring, the Blackbirds are obliged to suspend their nests near the tops of the stout stalks, of which they bring several together, weaving the leaves in the nests and around them in order to make them secure. The Everglades are seldom free from wind, which often blows a gale, waving the grass back and forth furiously, so that the birds are forced to build exceedingly compact structures or they will be blown to pieces. The nests are therefore made of the leaves of the coarse saw grass which abounds, neatly and firmly woven together. The swaying motion to which their domiciles are constantly subjected has a tendency to throw the eggs out, and would were it not that the birds, who have doubtlessly been taught by the experience of former generations, build their nests very deep, and, not content with this, they make them more secure by contracting the entrance so much that it is impossible for the eggs to fall out even when the grass bends so that the tops touch the water. I discovered the first nests in that locality on the 8th of April, and they each contained three eggs, which I afterwards found were all that were ever deposited. These, contrary to the rule among birds which lay a less number of eggs in the South than in the North, were proportionately smaller when compared with New England specimens.

"May 1 of that season found me standing on one of the small outer keys, about 100 miles south of the point last described. This islet, like many others, contained a small lagoon in the center, around which was a belt of land that supported a number of trees, mainly the kinds known as "buttonwood" and "mangrove." There were a large number of Red-winged Blackbirds breeding on this key; but I was puzzled to find the nests, for I could not see them in the trees, and there were no bushes or grass. After watching them attentively for a few moments I saw a female emerge from a small hole in a buttonwood tree, not far from the ground, and, climbing up to it, discovered the nest, which was built like that of a Bluebird. I afterwards found several in similar places, all containing eggs. For a time I could not understand why the birds had chosen these novel situations for homes, but the 'ha-ha' of a group of Fish Crows helped to enlighten me; for I knew that the predatory habits of the latter-named species renders the eggs of all birds unsafe if exposed, unless the owners are

sufficiently strong to protect them, and what the Redwings lack in strength they make up in cunning, as they placed their treasures where it was impossible for their enemies to get at them."[1]

In the Ralph collection of eggs are three sets taken near Lake Worth, Florida, in the spring of 1894, which are undoubtedly referable to this subspecies. They are smaller than the eggs of the Red-winged Blackbird, eight specimens averaging 22.19 by 16.76 millimetres, or about 0.87 by 0.66 inch. I have not figured a specimen, as they are indistinguishable from those of the Red-winged Blackbird except by their smaller size.

## 177. Agelaius gubernator (Wagler).

BICOLORED BLACKBIRD.

*Psarocolius gubernator* Wagler, Isis, IV, 1832, 281.
*Agelaius gubernator* Bonaparte, Geographical and Comprehensive List, 1838, 29.
(B 402, C 212*a*, R 261*a*, C 317, U 499.)

Geographical range: Pacific Coast districts, from western Washington south through western Oregon, and California, west of the Cascade Mountains and the Sierra Nevadas to Lower California and Mexico. Casually to western Nevada and southeastern California (Inyo County).

The breeding range of the Bicolored or Crimson-shouldered Blackbird seems to be a rather contracted one. This species was first obtained in the United States by Mr. J. K. Townsend, on the lower Columbia River, and its habitat appears to be mainly restricted to the regions west of the Cascade Mountains in Washington and Oregon and west of the Sierra Nevadas in California. Mr. Walter E. Bryant reports it as breeding near El Rosario, in Lower California. A few specimens have been taken at points east of the Sierra Nevadas, where it has been reported as breeding near Reno and along the Truckee River, Nevada. I have also reported it as nesting in the vicinity of Camp Harney, Oregon, but I am now fully convinced that I was mistaken in my identification of this species, and it seems more than probable that the other records are also questionable.

It is a very easy matter to make such misidentifications, especially in specimens not fully adult, and, after a careful study of the subject, I now believe that this species does not breed anywhere east of these mountains, in the so-called "Great Basin region."

The Bicolored Blackbird seems to be pretty generally distributed throughout such portions of the State of California, west of the Sierra Nevadas, as are adapted to its needs, wherever water is abundant. It appears to be more common in the interior than in the immediate vicinity of the coast. It is especially numerous in the Sacramento and San Joaquin valleys, and many of these birds winter there. Mr. Charles A. Allen writes me that it arrives on its breeding grounds in Marin County, California, early in March, where it breeds abundantly near Olema, as well as in Yolo and Lake counties.

[1] Birds of Florida, etc., 1881, p. 136.

Its general habits, food, call-notes, etc., are similar to those of the Red-winged Blackbird; like this, it breeds among the tule, rushes, and coarse grass, either in single pairs or in colonies, in or near marshes, placing its nest in tufts of marsh grass and reeds, from 1 to 3 feet above the water, and similar materials are used in its construction.

The eggs, from two to four in number (very rarely more), resemble those of the Red-winged Blackbird, excepting that they are a trifle smaller and perhaps on an average less heavily marked, but otherwise the same description will answer for both. The breeding season in California begins usually in the last ten days of April, and continues throughout May.

Ordinarily, I believe, two broods are raised in a season, the young of the first broods gathering in flocks as soon as they are large enough to care for themselves.

The average measurement of forty-four specimens in the United States National Museum collection is 24.07 by 17.35 millimetres, or about 0.95 by 0.68 inch. The largest egg in the series measures 26.42 by 17.78 millimetres, or 1.04 by 0.70 inches; the smallest, 21.34 by 16.76 millimetres, or 0.84 by 0.66 inch.

The type specimen, No. 17599 (Pl. 6, Fig. 16), from a set of four, was taken by Mr. Charles A. Allen, near Nicasio, Marin County, California, on April 23, 1877, and represents a specimen with a smoky ground color, while No. 25351 (Pl. 6, Fig. 17), also from a set of four, in the Ralph collection, taken near Olema, California, on April 23, 1884, represents one of the ordinary types.

## 178. Agelaius tricolor (Nuttall).

TRICOLORED BLACKBIRD.

*Icterus tricolor* Nuttall, Audubon's Ornithological Biography, V, 1839, Pl. 388, Fig. 1.
*Agelaius tricolor* Bonaparte, Geographical and Comparative List, 1838, 29.
(B 403, C 212*b*, R 262, C 318, U 500.)

Geographical range: Southwestern Oregon, south through California, west of the Sierra Nevadas, to northern Lower California.

The breeding range of the Tricolored or Red and White Shouldered Blackbird is probably coextensive with its geographical distribution. It appears to be a resident wherever found, and, as far as I can learn, has not yet been reported from points farther north than Klamath Lake, in southwestern Oregon. Here it was first met with by Dr. J. S. Newberry, and later by Dr. James C. Merrill, United States Army, who noticed a few among the common Red-winged Blackbirds there, but did not find it breeding. I failed to observe it while stationed at Fort Klamath, and it is probably uncommon. It is known to breed abundantly in the interior valleys of California, especially in the southern and central portions of the State, but it is not found east of the Sierra Nevadas.

Mr. F. Stephens writes to me: "*Agelaius tricolor* is an abundant winter resident in the larger valleys of Los Angeles and Orange counties, occurring here in very large flocks. In summer it is somewhat rarer, but several colonies are

known to me to breed in tule marshes from sea level up to an altitude of 1,500 feet. I rarely noticed it in the higher foothills and mountains."

In Lower California Mr. A. W. Anthony reports the Tricolored Blackbird: "Rather common along the northwest coast, breeding in all fresh-water marshes; and in San Rafael Valley Mr. L. Belding found a large colony nesting in tules, May, 1885."[1]

Mr. L. Belding, in his manuscript notes, which he kindly placed at my disposal, describes the breeding place of an immense colony of this species, found by him on May 10, 1879, near Stockton, California, as follows: "I noticed a flight of these birds, mostly females, coming and going from and to the center of an extensive tule marsh to a pasture some 3 miles distant from this place, not in compact flocks, but a straggling flight of individuals, which seemed to move independently of each other; those returning were laden with grasshoppers for their young. By following the birds I found their nests, which were placed in last year's tule and in a vigorous growth of that of the present season. They averaged about a nest to the square yard, and these were usually attached to the tule stems of this and last year's growth, about 2 feet, and occasionally only a foot, above the water. I examined nearly a hundred nests. The greatest number of eggs found in any one was three; the usual number was two, and many contained but a single egg or a young bird. None of the young were more than a week old. The colony, consisting of many hundreds, was apparently not thriving; some of the nests had slipped from their moorings and were capsized in the water, many young were dead, and a considerable number of the eggs were addled; all of the nests examined were built without mud."

Mr. H. W. Henshaw found a colony of these birds nesting in a dry pasture, in a patch of nettles and briars covering between 3 and 4 acres, in the Santa Clara Valley, California, on June 21, 1875. The nettles grew so dense and high (sometimes attaining a height of 12 feet) that he found it almost impossible to force his way into their midst, nor did he succeed in penetrating beyond a few yards. He remarks: "I speak within bounds when I say that two hundred pairs had here congregated to rear their young, and the odor arising from some portions was almost as strong as from the Cormorant rookeries. The nests were there by hundreds, nearly every bush holding several. These were, however, mostly old, showing that the place had served for a breeding resort for probably many years. A few of the nests were this season's and contained young, none that I saw having eggs, though could I have extended my search some would doubtless have been found. The nests were rather slight, flimsy structures, but in general resembled those made by the Redwing of the East, and were fastened on the bushes in the same way. My presence among them created a great disturbance, and the trees were soon covered with the parent birds, one and all resenting this intrusion on their old-time possessions in no gentle tones. A few days later I came across an immense flock of young birds in the streaked nesting plumage, able to take care of themselves; they had gathered thus together and fairly

[1] Birds of Lower California, California Academy of Natural Sciences, Vol. II, 1889, p. 294.

covered several small trees by the roadside. In all the number there was not a single adult bird."[1]

The general habits, food, etc., of the Tricolored Blackbird are very similar to those of the eastern Redwing, but their notes are said to be quite different. The young seem to be fed almost entirely on grasshoppers, and an immense number of these insects must be yearly destroyed by them, which fully counterbalances the trifling damage they may occasionally commit in the grain fields.

From one to four eggs are laid, sets of three usually prevailing, and two broods are probably raised each year; the breeding season appears to be at its height during the first week in May.

The eggs resemble those of the Red-winged Blackbird in shape and general style of markings, averaging a trifle smaller, however; and both the ground color and the markings appear (at least in the majority of specimens before me) to be somewhat paler than in the eggs of the former, but there is not sufficient difference to require a special description.

The average measurement of forty-one specimens in the United States National Museum collection is 23.94 by 17.15 millimetres, or about 0.94 by 0.67 inch. The largest egg in the series measures 26.42 by 17.78 millimetres, or 1.04 by 0.70 inches; the smallest, 21.59 by 16.51 millimetres, or 0.85 by 0.65 inch.

The type specimens, Nos. 25354 and 25356 (Pl. 6, Figs. 18 and 19), both from the Ralph collection, each from a set of three eggs and representing the two prevailing styles of coloration, were taken near Lakeside, San Diego County, California, on May 4, 1890.

## 179. Sturnella magna (Linnæus).

MEADOWLARK.

*Alauda magna* Linnæus, Systema Naturæ, ed. 10, I, 1758, 167.
*Sturnella magna* Swainson, Philosophical Magazine, I, 1827, 436.

(B 406, C 214, R 263, C 320, U 501.)

Geographical range: Eastern North America; north in the Dominion of Canada to southern Nova Scotia, southern New Brunswick, Quebec, and Ontario to eastern Manitoba. West to Minnesota, Iowa, Missouri, eastern Kansas, the Indian Territory, and Texas. South to Florida and the Gulf coast. Accidental in England.

The well-known Meadow or Old Field Lark is a constant resident south of latitude 39°, and many winter farther north in favorable localities. It breeds throughout its range, excepting the western parts of the Indian Territory and western Texas, and in suitable places it is quite common. In our Northern States and the southern parts of the Dominion of Canada it is only a summer resident, arriving usually about April 1 and remaining ordinarily until the latter part of October and occasionally into November; while in the northeastern portions of its range it is nowhere common. Excepting during the breeding

[1] Geographical Surveys West of the 100th Meridian, Wheeler, Appendix JJ, 1876, p. 249.

season it is more or less gregarious, and small flocks may often be seen roving about in search of good feeding grounds. This is especially true in the fall of the year, when several families unite, and as many as two dozen may occasionally be flushed in a field over which they scatter, roaming about independently of each other; but when one takes wing all the others in the vicinity generally follow. In the Eastern States the Meadowlark is a rather shy bird and not easily approached within gunshot, while in many parts of the South and in the Middle States it is quite the reverse and generally allows itself to be closely approached without taking wing. Its flight is rather laborious, at least in starting, and is accomplished by a series of rapid movements of the wings, alternating with short distances of sailing, and is rarely protracted. On alighting, which is almost invariably accompanied with a twitching of its tail, it usually settles on some fence rail, post, bowlder, weed stalk, or on a hillock in a meadow from which it can get a good view of the surroundings, and but rarely on a limb of a tree. Its favorite resorts are meadows, fallow fields, pastures, and clearings, but in some sections, as in northern Florida, for instance, it also frequents the low, open pine woods, and nests in these.

Our handsome Meadowlark is a favorite with most people, but its clear, whistling notes, so frequently heard in the early spring, though melodious and pleasing to the ear, are not much varied.

One of its songs sounds like "héé-héé-héé-théé-hea," uttered in a clear, high key; a second or call note resembles "éék, éék," ending with a tremulous quaver. All of these notes, although short, are difficult to reproduce in type. Mr. W. E. Grover, of Galveston, Texas, writes me that one of their calls sounds like a long-drawn, whistled "laze-kill-déé."

Considered from an economic point of view, it is one of the best feathered friends the farmer has, and deserves the fullest protection, feeding, as it does, mainly on noxious insects and their larvæ, caterpillars, moths, grasshoppers, spiders, worms, etc., and only to a limited extent on small grain. In the late fall and winter it resorts sometimes to the roads and barnyards, where it may occasionally be seen searching among the droppings of horses for undigested particles of grain.

The Meadowlark spends the greater part of its time on the ground, and all of its food is procured there. It is rare to find one alone, and I believe it remains paired for life.

Nidification usually begins in the first half of May and lasts through the greater part of June, and occasionally fresh eggs are found during the first ten days in July, possibly second broods, but as a rule, in the northern parts of its range at least, only a single brood is raised in a season.

Both sexes assist in the construction of the nest, which is always placed on the ground, either in a natural depression or in a little hollow scratched out by the birds, alongside a bunch of grass or weeds. It is invariably well hidden, stalks and blades of grass being pulled and partly woven over it, forming a more or less complete dome or roof, generally concealing the eggs or young effectually from view. The nest proper consists of a slight lining of dry, wiry

grass, bits of stubble, weed stalks, and occasionally pine needles; the inner cup is finished with finer materials of the same kind. Occasionally a covered way, from 18 to 36 inches in length, leads to the nest, which in such cases is placed at the end of the tunnel, beside a tussock of rank grass, and in such situations they are difficult to find. The female is a close sitter, while the male shows considerable anxiety and flutters about the vicinity, often betraying the location of the nest in this way. Considerable additional work is sometimes done on the nest after the eggs have been deposited.

This bird is occasionally imposed on by the Cowbird, but not very often, and an instance has been recorded where a second nest was built over the one containing the parasitic egg. Most of the nests are placed in level meadows, but where side hills, especially those with a southern exposure, are available, it frequently selects them. The Meadowlark has many enemies, and numbers of its eggs and young are destroyed every season by vermin, etc., and by the agency of man as well. In dairy regions the mowing-machine uncovers and destroys numbers, and in many places in the New England States and in central New York it is becoming rarer with each year.

The nest of the Meadowlark varies somewhat in size and bulk according to the situation. An average one, now before me, No. 25093, United States National Museum collection, taken by Dr. William L. Ralph, measures 7 inches in outer diameter by 3 inches deep; the inner cup is 3 inches in diameter by 2 inches deep. It is composed exteriorly of coarse grass and lined with fine wire grass, and it is only partly domed.

The number of eggs to a set varies from three to seven, sets of five being most common, and one is deposited daily. Incubation lasts about fifteen or sixteen days, both sexes assisting in these duties. The young are able to leave the nest in about two weeks, which is some time before they are able to fly, and they are very adept in hiding at the slightest sign of danger. After they are able to provide for themselves they gather into small parties and remain in the vicinity where they were reared until the latter part of October, when they gradually move southward. None, as far as known, pass beyond the United States to winter. They find congenial homes at this time of the year in the more southern States, and are then especially abundant along the Gulf coast.

The eggs of the Meadowlark vary considerably both in shape and size; the majority are ovate, while others are short, elliptical, and elongate ovate. The shell is strong, closely granulated, and moderately glossy. The ground color is usually pure white; this is occasionally covered with a pale pinkish suffusion, and it is very rarely pale greenish white. The eggs are more or less profusely spotted, blotched, and speckled over the entire surface with different shades of brown, ferruginous, pale heliotrope purple, and lavender; these markings generally predominate about the larger end of the egg, and are rarely heavy enough to hide the ground color.

In some sets the markings consist mainly of a profusion of fine dots; in others the spots are well rounded and fewer in number; and again they occur

in the shape of irregular and coarse blotches, mixed with finer specks and dots; in fact, there is an endless variation in the style of markings.

The average measurement of a series of two hundred and one specimens in the United States National Museum collection is 27.75 by 20.35 millimetres, or 1.09 by 0.80 inches. The largest egg measures 30.78 by 22.61 millimetres, or 1.21 by 0.89 inches; the smallest, 21.59 by 18.29 millimetres, or 0.85 by 0.72 inch.

The type specimen, No. 23755 (Pl. 6, Fig. 20), from a set of four eggs, taken by Mr. C. W. Richmond, near Washington, District of Columbia, on May 12, 1889, has been selected to show the occasional variation in the ground color, being a pale green in this instance. No. 25858 (Pl. 6, Fig. 21), from a set of five eggs, Ralph collection, taken by Dr. William L. Ralph, in Oneida County, New York, on May 20, 1882, represents a normally colored and average-marked egg of this species.

## 180. Sturnella magna mexicana (Sclater).

MEXICAN MEADOWLARK.

*Sturnella mexicana* Sclater, Ibis, 1861, 179.
*Sturnella magna* var. *mexicana* Baird, Brewer and Ridgway, History of North American Birds, Vol. II, 1874, 172.

(B —, C —, R 263*a*, C 321, U 501*a*.)

Geographical range: Central and northern Mexico and contiguous border of the United States; from southern Arizona to the lower Rio Grande Valley, in Texas, and possibly along the Gulf coast to southern Florida; south to Costa Rica, Central America.

The breeding range of the Mexican Meadowlark, a somewhat smaller race than the preceding, with a smaller bill and larger and stouter feet, is confined to our southern border, as indicated above. It appears to be rather uncommon within the limits of the United States, unless we include the small, dark bird found in southern Florida, which Mr. Frank M. Chapman refers to this subspecies. He makes the following remarks about the Florida bird:

"Abundant. Comparison will not permit me to refer the small, dark Meadowlark, resident in Florida, to *Sturnella magna*, and while they are not fully typical of *Sturnella magna mexicana*, they approach it so closely as to apparently render subspecific separation impossible. The Florida birds are perhaps slightly darker above, the neck gorget is somewhat wider, and the yellow of the under parts has more of a sulphur tint than in Mexican specimens."[1]

Among the series of skins in the United States National Museum collection are specimens from Tennessee and southern Indiana which are about as dark and as small as the southern Florida birds; the difference, if any, is very trifling, and if the Florida bird is admitted to be *Sturnella magna mexicana*, these would also have to be included in this race. They certainly differ considerably from some skins examined by me, which were taken near Brownsville, Texas, and

[1] The Auk, Vol. V, 1888, p. 273.

Matamoras, Mexico, and I believe another good subspecies exists in southern Texas which still remains to be described, and is not readily referable to either *Sturnella magna* or any of its recognized subspecies.

The Mexican Meadowlark was first added to our fauna by Dr. James C. Merrill, United States Army, who took specimens near Fort Brown, Texas, on August 21 and September 13, 1877. It appears to be only a summer visitor there, and was abundant from April to October. Its notes and habits do not seem to differ essentially from those of *Sturnella magna*.

Mr. F. Stephens also took both male and female of this subspecies near old Camp Crittenden, in Sonoita Valley, Arizona, on July 22 and 24, 1884, thus extending its range considerably westward, and showing that it overlaps that of the Western Meadowlark. Mr. Stephens writes: "I do not recall anything peculiar in their habits, and think I did not hear their song."

It is reported a common resident in Costa Rica, which appears to mark the southern boundary of its range in Central America.

A set of four eggs in the Ralph collection, taken near Fort Brown, Texas, May 3, 1892, is probably referable to this subspecies. They resemble the eggs of the common Meadowlark in coloration and markings, being short ovate in shape, and considerably smaller.

They measure 25.91 by 20.32, 25.65 by 20.57, 25.40 by 21.34, and 25.15 by 20.32 millimetres; or 1.02 by 0.80, 1.01 by 0.81, 1 by 0.84, and 0.99 by 0.80 inches.

The type specimen, No. 25733 (Pl. 6, Fig. 22), belongs to this set. The nest was found on a prairie, concealed by a bunch of grass, and was composed of dry grass. The eggs were fresh.

## 181. Sturnella magna neglecta (Audubon).

WESTERN MEADOWLARK.

*Sturnella neglecta* Audubon, Birds of America, VII, 1843, 339, Pl. 487.
*Sturnella magna* var. *neglecta* Allen, Bulletin Museum of Comparative Zoology, III, No. 2, July, 1872, 178.

(B 407, C 214*a*, R 264, C 322, U 501*b*.)

Geographical range: Western North America, north to southern British Columbia, southern Alberta, southwestern Saskatchewan, and western Manitoba, Dominion of Canada; east regularly to North and South Dakota, Nebraska, Kansas, western Indian Territory, and western Texas; irregularly or less regularly to Minnesota and Iowa, sparingly to Wisconsin and Illinois; south to Lower California and northern Mexico.

The breeding range of the Western Meadowlark, a somewhat paler and grayer bird than *Sturnella magna*, is coextensive with its distribution in the United States, excepting the lower Rio Grande Valley, in Texas, where it is replaced by the Mexican Meadowlark. Along the eastern border of its range in some localities it overlaps that of *Sturnella magna* for considerable distances, but does not appear to interbreed with it. The greatest difference between these

two birds is the entire dissimilarity of their song and call notes. Our western bird is universally and appropriately conceded to be by far the better songster. Dr. J. A. Allen expresses these differences very pertinently as follows:

"It [its song] differs from that of the Meadowlark in the Eastern States in the notes being louder and wilder, and at the same time more liquid, mellower, and far sweeter. They have a pensiveness and a general character remarkably in harmony with the half-dreary wildness of the primitive prairie, as though the bird had received from its surroundings their peculiar impress, while if less loud their songs would hardly reach their mates above the strong winds that almost constantly sweep over the prairies in the hot months. It differs, too, in the less frequency of the harsh, complaining chatter so conspicuous in the eastern birds, so much so that at first I suspected this to be wholly wanting."[1]

It is almost impossible to do justice on paper to some of the exquisite strains uttered by this bird, and being no musician I shall not attempt it. I can only compare it in some respects to the matchless, clear, tinkling utterances of the finest of our western songsters, Townsend's Solitaire, and I refer the reader for further information to Mr. Charles N. Allen's paper on this subject in the Bulletin of the Nuttall Ornithological Club (Vol. 6, 1881, pp. 145–150).

Mr. R. H. Lawrence sends me an imitation of one of its songs as noted by him on October 25, 1892, near Ridgefield, Clarke County, Washington, which he renders as follows: "Hu-er-hu, whick-ée, hu-er-hu-wéer," given with spirit and ringing clearness. One of its commoner songs is said by Mr. Charles A. Keeler to resemble the syllables "twee-tweedle-tee-te-twe."

The Western Meadowlark, like its eastern relative, is a hardy bird, and many winter in some of the warmer valleys of Washington and Idaho, but in the late fall the majority retire farther south to California, Arizona, and northern Mexico, usually returning to their breeding grounds during March.

In Colorado and Arizona it has been met with in summer at altitudes of from 8,000 to 10,000 feet.

Its general habits resemble those of the eastern Meadowlark, and, like this bird, it prefers rather open country, meadow and prairie lands, and especially the vicinity of streams, where a luxuriant growth of grass is usually to be found. In the thinly settled regions in the West it is exceedingly tame and familiar, and may frequently be seen perched on the roofs of houses and outbuildings, pouring forth its clear, ringing, and melodious notes, which can be heard for considerable distances. One of its most common call notes sounds like "tchäeck," or "äeck."

Its food consists principally of small beetles, grasshoppers and their eggs, and numerous other insects; even the large, repulsive-looking black crickets, which are so numerous and destructive in some seasons in the West, are not rejected by them, and only when such food can not be obtained does it feed on small grains and different wild seeds. It is unquestionably one of the best friends the farmer has, and fully deserves his good will and protection.

[1] Memoirs Boston Society of Natural History, I, Pt. IV, 1868, pp. 496, 497.

Dr. Coues, in Birds of the Northwest, 1874 (p. 192), writes: "In April, before pairing, hundreds used to frequent daily the parade ground of Fort Randall, where, as the grass was yet scarcely sprouted, good opportunity was offered of observing their characteristic habit—one not so generally known as it should be, since it is related to the peculiar shape of the bill. The birds may be seen scattered all over the ground, busily tugging at something; and on walking over the scene of their operations, the ground, newly softened by the spring thaw, is seen to be riddled with thousands of little holes, which the birds make in search of food. The holes are quite smooth, not a turning over of the surface of the ground, but clean borings, like those made by sinking in the end of a light walking stick, just as if the birds inserted their bills and then worked them about till the holes were of sufficient size. Whether they bored at random, or were guided by some sense in finding their prey, and what particular objects they were searching for, I did not ascertain; but the habit was so fixed and so continually persevered in as to attract general attention."

Although not quite certain, I think I can account for the actions of the birds observed by the Doctor. They were looking for and feeding on the eggs of the locust, which are deposited just below the surface of the ground. I have noticed the same thing at Camp Harney, Oregon, where these birds were likewise very abundant. One or two pairs nested every season on the edge of the parade ground, among bunches of dry grass growing beside the driveway around it, and within a few yards of the officers' quarters.

In the more northern portions of its breeding range nidification ordinarily commences about the first week in May, rarely earlier, and it takes usually about a week to complete the nest. This is generally placed in a slight natural depression, or in one made by the birds, at the base of a bunch of thick rye grass, the dry blades of the previous year hanging down from the side and hiding the nest naturally, or a number of blades are pulled down, covering the nest and forming an arch over it. Some of these structures are exceedingly well hidden, and show considerable ingenuity on the part of the builders. Occasionally where the grass is dense enough to permit it, the nest is approached by a covered way, leading to the nest proper, sometimes fully 4 feet away. The entrance resembles the runway of some small rodent. The inner lining of the nest consists ordinarily of dry grass, on which the eggs are deposited, and resembles that of the common Meadowlark in every respect.

Mr. A. W. Anthony writes that he found a nest containing six eggs in an open field, near Beaverton, Oregon, May 21, in which incubation had commenced, the nest being placed in a hole in the ground fully 8 inches deep; and at San Quentin, Lower California, he found it nesting in the salt marshes about the bay, a set of four fresh eggs being taken on March 21.

Throughout the greater part of its range full sets of eggs are usually found during the last half of May and up to the middle of June. In western Texas, in Concho and Tom Green counties, Mr. William Lloyd reports finding two fresh eggs of this subspecies on March 27, 1882, and a full set of five eggs on April 15, 1883.

The earliest dates on which eggs in the United States National Museum collection have been taken, are April 13, 1893, at Santa Ysabel, San Diego County, California, collected by Mr. H. W. Henshaw, and a set of four fresh eggs, taken by Dr. A. K. Fisher, United States Department of Agriculture, at Wilcox, Arizona, April 22, 1892; a set of three was also taken by the writer at Camp Harney, Oregon, April 22, 1877, an unusually early date for this locality. Along our southern border the Western Meadowlark nests fully a month earlier than farther north, and at least two broods are raised here in a season; but I believe that second broods are not infrequent in favorable localities considerably farther north, where fresh eggs are sometimes found as late as the second week in July. It is one of the species occasionally imposed on by the Cowbird.

Both sexes assist in the construction of the nest and also in incubation, which lasts about fifteen days. An egg is deposited daily until the set is completed. The young leave the nest before they are able to fly, depending for safety on hiding themselves in the grass, and they are cared for by the parents until they can provide for themselves. When they are able to do this they gather into small companies and roam over the surrounding country. I do not believe that any of the young of the year remain in our Northwestern States through the winter; they probably move slowly southward in the late fall.

From three to seven eggs are laid to a set, five being most commonly found. Sets of four and six are not infrequent, but sets of seven are very rare.

I can not detect any difference between the eggs of this subspecies and those of the eastern Meadowlark excepting in size. The eggs of the Western Meadowlark appear to average a trifle larger as a rule; otherwise the same description will answer for both.

The average measurement of two hundred and six specimens in the United States National Museum collection is 28.33 by 20.60 millimetres, or about 1.12 by 0.81 inches. The largest egg in the series measures 30.78 by 21.84 millimetres, or 1.21 by 0.86 inches; the smallest, 25.65 by 20.07 millimetres, or 1.01 by 0.79 inches.

The type specimens, Nos. 20275 and 20283 (Pl. 6, Figs. 23 and 24), both from sets of five, were taken by the writer, the first at Camp Harney, June 3, 1876, the last at Fort Klamath, Oregon, June 7, 1882.

Fig. 23 represents a specimen with very few fine markings, somewhat below the average size; fig. 24, a good-sized egg of the better-marked type of coloration. There are no eggs among the series of *Sturnella magna* that are as lightly marked as fig. 23; but there is a still lighter-marked set of five eggs among the series under consideration, taken near Ogden, Utah, on June 7, 1871. With these two exceptions, I can not see any difference, as the light-green ground color found now and then in the eggs of *Sturnella magna* occurs likewise, though very rarely, in the western form.

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## 182. Icterus icterus (Linnæus).

TROUPIAL

*Oriolus icterus* Linnæus, Systemæ Naturæ, ed. 12, I, 1766, 161.
*Icterus icterus* Ridgway, Proceedings U. S. National Museum, VIII, 1885, 355.
(B 408, C —, R 265, C 323, U (502).)

Geographical range: Coast regions of Colombia and Venezuela, South America, and the Island of Trinidad. (West Indies; introduced.) Accidental in South Carolina (Charleston).

The Troupial, a South American species, can only be considered a straggler in the United States, and is admitted to our fauna on the strength of a single specimen shot by Mr. John H. Audubon in Charleston, South Carolina. Very little has yet been written on the life history of this bird. It is said to be a common resident of the coast districts of Colombia and Venezuela, South America, and of the Island of Trinidad, and to be an accidental visitor to some of the West India islands. Its eggs, usually four in number, are described as having a ground color of reddish drab, and as being very generally blotched with markings of a deep claret brown and faint purple, the markings being deeper and larger at one end. The nest is said to be a long, pensile structure, suspended from slender limbs of trees and difficult to reach. There are no eggs of this species in the United States National Museum collection.

## 183. Icterus gularis Wagler.

GULAR ORIOLE.

*Icterus gularis* Wagler, Isis, 1829, p. 754.
(B —, C —, R —, C —, U —.)

Geographical range: From Honduras and Guatemala, Central America, through southern Mexico; north to the State of Tamaulipas, Mexico, and southern Louisiana.

This large and handsome Oriole claims a place in our fauna from the fact that a specimen was obtained in southern Louisiana, which I recorded in "The Auk" (Vol. X, pp. 366, 367), and which I supposed at the time to be referable to *Icterus gularis yucatanensis* (Von Berlepsch), on the strength of Mr. R. Ridgway's identification. He has since changed his opinion and writes as follows: "The identification was made when the series of specimens in the National Museum collection of both forms was very meager, and was based on color alone, the intense orange being supposed to be peculiar to the Yucatan bird. A fine series of the latter, subsequently received from Dr. Gaumer, as well as a considerable number of true *gularis* from eastern Mexico, shows that the supposed color difference, while in the main reliable, is not a constant character, but that there is a constant and very decided difference in the proportions between the two forms which will serve to readily separate them. The Louisiana specimen

is true *gularis* as to proportions, and represents the maximum brightness." There is a single specimen (a very highly colored male) in the collection of the United States Department of Agriculture, taken on March 21, 1891, at Hidalgo, Tamaulipas, which, as far as I know, marks the northern limits of its range in Mexico.

The following notes on this species were originally published by me in the article above quoted:

"Mr. E. A. McIlhenny recently sent me for identification a skin of a handsome Oriole, which proves to be this subspecies, and which he kindly presented to the collection of the United States National Museum here. He shot the bird on June 3, 1893, on Avery's Island, New Iberia Parish, Louisiana, from a flock of four; and he writes that, although these birds were quite tame, he only shot the one, in the hope that the remaining ones would bring others there. His attention was first called to them by their unfamiliar whistle, which is a a soft, flute-like note, expressed by the word 'whae' about as well as anything; this is repeated from time to time as the birds move from limb to limb in search of food. On dissecting the specimen he found a number of small green caterpillars and several spiders, but their principal food seemed to consist of the small purple figs, which were just ripe. While in search of food they move about exactly as the Baltimore Oriole does, swinging from slender twigs head downward, looking under limbs for insects. He observed the remaining three birds again on June 5 in some fig trees in the plantation garden.

"Although this beautiful Oriole may be an irregular, it appears to be sometimes a common summer visitor along the Gulf coast of Louisiana, and less frequently perhaps of Mississippi as well, as the following notes will show; and it seems even probable that it occasionally breeds within our borders. Mr. McIlhenny had already obtained a specimen of this Oriole two years previously, and sent me the following extracts, relating to its occurrence, copied from his handbook:

"'*May 17, 1891.*—John Goffney brought me to-day a beautiful bird that he killed in the swamp back of the sugarhouse. It is undoubtedly an Oriole, but one I have never seen before. Owing to the poor condition of the plumage, I did not make a skin of it. The markings are: Head, breast, under and upper tail coverts, orange; wings, black, with orange markings at their base; back, black from base of neck to upper tail coverts. It is a male, and much larger than the Baltimore Oriole. On dissection the only food found was a few insects and three small caterpillars.

"'*August 3, 1892.*—To-day I went out to Mr. Herter's rice field to try and get some of the birds I hear feed there. I met J. Mason and induced him to go with me. We arrived there quite early and saw a flock of about twenty of the birds I was after; they were feeding on the rice in company with Bobolinks and Red-winged Blackbirds. We found them very wild, and it was impossible to get a shot. The men who mind the rice told me they sometimes killed a few, and they saw some every year in these fields. I went to the house of a negro who had killed some the day before to see if I could get any, but found they

had all been used for food. I saw, however, the heads, wings, and feathers of several specimens, and think that the birds are undoubtedly the same as the one brought me by John Goffney on May 17 of last year, that it is an Oriole I do not doubt.

"'On showing the specimen killed on June 3, 1893, to Mr. Allen Mehle, on the 14th of the same month, he told me that a flock of about two hundred of these birds came to his place at Mississippi City, Mississippi, in July, 1892, and remained there for some time. Numbers of them were killed and several were sent to a taxidermist in New Orleans, but he did not know his name. He is positive it is the same bird, and as no one knew what they were, he had some mounted.'"

In his letter of September 12, 1893, Mr. McIlhenny writes me as follows: "I showed the skin to Capt. Jim Hare, of the Trinity Shoal light-ship, before I sent it to you, and he told me that two birds of exactly the same appearance had struck the light and had been killed this spring, in April. His ship is 60 miles out to sea and due south of here. Captain Hare tells me that he often sees large flocks of small birds flying high in the air during their migrations."

In a more recent letter Mr. E. A. McIlhenny sent me some additional information on this species, taken from his field notes. Under date of June 3, 1894, he says: "While in search of nests to-day near the salt mine, I saw a male ? of the large Oriole I found here last year; I had a good view of him, being quite near, but unfortunately had no gun." Under date of June 16 he made the following entry: "Derouin told me to-day that he had seen about twenty of the large Orioles (like those he killed last year) in a field, and his father, who had also seen them, confirmed his statement, but I failed to find them. I offered him a reward then for every one he brought me in good condition, but a few days after this I left for Greenland. On my return here, October 1, I found that five of these birds had been killed by this party, as near as I could learn, about August 20, and were brought to my house; but as no one there could skin them, they were thrown away."

The fact that these birds have now been seen regularly on Avery's Island, Louisiana, for several seasons and throughout the summer, certainly indicates that they are not casual stragglers, but regular summer residents, and probably breed there, and possibly also along the Gulf coast of Texas.

The only description of the egg of this species I have been able to find is that published by Mr. R. Owen in "The Ibis" (Vol. III, 1861, pp. 62, 63), who took a female and one egg near San Geronimo, Guatemala, on June 8, 1860. The egg is described as a pale gray, blotched and streaked with very dark brown; it measures 1 by 0.70 inch.

The nest probably resembles that of Audubon's Oriole, but I have been unable to find a description of it.

## 184. Icterus audubonii GIRAUD.

AUDUBON'S ORIOLE.

*Icterus audubonii* GIRAUD, Sixteen Texas Birds, 1841, 3.
(B 409, C 220, R 266, C 330, U 503.)

GEOGRAPHICAL RANGE: Central and eastern Mexico, from Juguila, Oaxaca, north to southern Texas (Bexar County).

Within the borders of the United States the breeding range of Audubon's Oriole appears to be confined to the lower Rio Grande Valley, where it is not uncommon in suitable localities and a resident throughout the year. Mr. H. P. Attwater, in his List of Birds Observed in the Vicinity of San Antonio, Bexar County, Texas, makes the following remarks:

"This species may perhaps be most properly described as a rare winter wanderer. I first observed it on March 27, 1890, when I secured a fine male among the tall pecan timber on the San Antonio River, just south of the city. I was attracted by the bird's note. I did not observe it again until 1891, when I obtained three specimens out of a flock of about eight or ten, at the same place, on February 13. The next day they were all gone, and I have never come across any since. Mr. Toudouze describes some birds (to me) which were new to him, and which he noticed on the Medina River, about the same time, which, from his description, were no doubt this species."[1]

Dr. James C. Merrill, United States Army, in his List of Birds Observed in the Vicinity of Fort Brown, Texas, writes as follows about this species:

"This fine Oriole is found in moderate abundance, and is the only species that is resident. During the summer months it is usually found in deep woods, at some distance from houses, but during the winter it is less shy and retiring. They are frequently captured and offered for sale by Mexicans in this vicinity, but several I have kept would not sing at all in captivity. When free their usual song is a prolonged and repeated whistle of extraordinary mellowness and sweetness, each note varying in pitch from the preceding. If once heard, it can never be forgotten."[2]

This is one of the sixteen new species of birds described by Mr. J. P. Giraud in the Annals of the New York Lyceum of Natural History, in 1841, from specimens collected in Texas in 1838. Some time afterwards Mr. John H. Clark, the naturalist attached to the Mexican Boundary Survey, obtained several specimens near Fort Ringgold, Texas. He reported it as not abundant, and its quiet manners and secluded habits prevented it from being very conspicuous. It was most frequently observed by him feeding on the fruit of the hackberry, but whenever approached while thus feeding it always showed signs of uneasiness, and soon after sought refuge in some place of greater concealment. Usually pairs were to be seen keeping close together, apparently preferring the thick

[1] The Auk, Vol. IX, 1892, p. 238.
[2] Proceedings of the U. S. National Museum, Vol. I, 1878, p. 134.

foliage found on the margins of ponds or in the old bed of the river. They did not communicate with each other by any note, and Mr. Clark was struck by their remarkable silence. Their habits seemed to him very different from those of any other Oriole with which he was acquainted.[1]

Like most Orioles, this bird undoubtedly feeds to a great extent on various insects, caterpillars, etc., and probably only occasionally on berries.

The first fully authenticated nests and eggs of this species were described by Mr. George B. Sennett, from specimens taken by him near Lomita, Texas, in May, 1878; and since then the United States National Museum has received a fine series of their eggs from Dr. William L. Ralph, all taken in the vicinity of Fort Brown, Texas. The nest of this Oriole is usually placed in mesquite trees, in thickets and open woods, from 6 to 14 feet from the ground. It is a semipensile structure, woven of fine, wire-like grass used while still green, and resembles those of the Hooded and Orchard Orioles, which are much better known. The nest is firmly attached both on the top and sides, to small branches and growing twigs, and, for the size of the bird, it appears rather small. One, now before me measures 3 inches in depth inside by about the same in inner diameter. The rim of the nest is somewhat contracted to prevent the eggs from being thrown out during high winds. The inner lining consists of somewhat finer grass tops, which still retain considerable strength, and are even now, when perfectly dry, difficult to break. Only a single nest of those found was placed in a bunch of Spanish moss, and this was suspended within reach of the ground; the others were all attached to small twigs.

Audubon's Oriole seems to be greatly imposed upon by the Red-eyed Cowbird; half of the sets in the collection contain from one to three of these parasitic eggs; but none of the equally common Dwarf Cowbird have, as far as I am aware, yet been found in them.

Nidification begins sometimes early in April, but usually about the last week in this month. Fresh eggs have been taken on April 23 and as late as June 8. Attempts are probably frequently made to rear two broods in a season, but many of them are unquestionably destroyed each year by the Red-eyed Cowbird, as well as through other causes.

The number of eggs to a set varies from three to five. Sets of one or two eggs of this Oriole, with two or three Cowbirds' eggs, seem to be most frequently found, some of the first-named eggs being thrown out to make room. The eggs differ somewhat in the character of their markings from those of the remainder of our Orioles; they are ovate and elongate ovate in shape, and the shell is rather frail and lusterless. The ground color is either pale bluish or grayish white, and occasionally the egg is only slightly flecked with fine markings and a few hair lines of different shades of brown and dark purple, these being nearly evenly distributed over the surface. In others the ground color is partly obscured with a pale purple suffusion, and more profusely blotched and streaked with different shades of claret brown, purple, ferruginous, and lavender, resembling somewhat

[1] History of North American Birds, 1874, Vol. II, p. 187.

certain styles of Brewer's Blackbirds' eggs, while an occasional set is profusely blotched with coarse, heavy markings of cinnamon rufous and numerous finer spots of the same tint, these almost completely hiding the ground color. The markings are generally heaviest about the larger end of the egg.

The average measurement of twenty-eight specimens in the United States National Museum collection is 25.15 by 17.98 millimetres, or 0.99 by 0.71 inch. The largest egg of the series measures 26.42 by 18.80 millimetres, or 1.04 by 0.74 inches; the smallest, 23.62 by 17.78 millimetres, or 0.93 by 0.70 inch.

The type specimens are all from the Ralph collection. No. 25536 (Pl. 6, Fig. 25), from a set of two eggs taken in Cameron County, Texas, May 7, 1892, represents one of the lighter-marked styles of eggs; No. 25538 (Pl. 6, Fig. 26), from a set of three taken on the same date and in the same locality as the former, containing also an egg of the Red-eyed Cowbird, represents one of the more common types; and No. 26349 (Pl. 6, Fig. 27), from a set of six eggs (three eggs of the owner and three of the Red-eyed Cowbird) taken on May 8, 1893 (same place as above), represents one of the heavier-marked eggs of this species.

## 185. Icterus parisorum Bonaparte

SCOTT'S ORIOLE.

*Icterus parisorum* Bonaparte, Proceedings Zoological Society, 1837, 109.
(B 411, C 219, R 268, C 329, U 504.)

Geographical range: Table-lands of Mexico, from Puebla and Vera Cruz north through western Texas, New Mexico, Arizona, and southern California to southern Nevada and southwestern Utah to about latitude 38°; Lower California.

The range of Scott's or the Mountain Oriole in the United States has been very materially increased within the last few years. It has been found by Mr. E. W. Nelson in central New Mexico, in the vicinity of Santa Fe, in July, 1890, and by different members of Dr. C. Hart Merriam's exploring parties of the Death Valley Expedition, in southeastern California and southern Nevada, in the spring and summer of 1891, while Dr. Merriam himself found it in the Beaverdam Mountains, in southwestern Utah, and it appears to be generally distributed throughout these regions, being fairly common in suitable localities.

The breeding range in the United States is coincident with its geographical distribution.

In Texas it does not appear to be found in the lower Rio Grande Valley, but seems to be restricted to the extreme western parts of the State only. Dr. A. K. Fisher, who is familiar with this species, tells me that he saw an adult male of Scott's Oriole among the yuccas at Eagle Flat, 15 miles east of Sierra Blanca, El Paso County, on May 8, 1894, this being the only positive Texas record I know of.

The skin in the United States National Museum collection on which the older Texas record is based was taken by one of the Pacific Railroad surveying parties

in 1856, and is labeled simply "Pecos." From my knowledge of the country (having been in New Mexico at the time) I am satisfied that it really came from near the head waters of the Pecos River, in central New Mexico, and in all probability from the vicinity of the place where this species has since been taken by Mr. Nelson, and not from the lower Pecos, in western Texas, as has been supposed.

Scott's Oriole is only a summer resident with us, arriving usually along our southern border about the last half of March or during the first week in April, and moving slowly northward to its breeding grounds.

Mr. F. Stephens writes: "In Arizona this species seems to be a rather rare summer resident of the foothills and lower part of the mountains, breeding up to the lower edge of the pines, but in migrating it passes well up into these. In Arizona I have seen it nest in the yucca, sycamore, oak, and pine trees; one nest found in an oak was not even semipensile, being supported at the sides and below by the upright branches between which it was placed. June and July appear to be the principal breeding months. In California Scott's Oriole is a rather rare summer resident of the deserts, principally the borders of the Mohave Desert. I found an old nest in a palm tree on the border of the Colorado Desert that I believe to have been built by this species. In the spring migration a few birds wander into the mountains, and occasionally they cross over the divide into the drainage toward the Pacific. In California the migration commences near the end of March, when this bird may be found in the foothills bordering the Colorado Desert. It is shy and restless; its song is clear, loud, and, to my ear, very musical; its greatest defect is its briefness, being about the shortest Oriole song I know."

Mr. A. W. Anthony, in a letter dated July 8, 1894, says: "*Icterus parisorum* was often seen about my camp south of San Quentin, Lower California, and it is rather common at the Mission of San Fernando. I shot one just below the United States boundary, and saw several others within 3 or 4 miles of the line, thus practically adding it to the list of San Diego County west of the range."

Personally I first met with Scott's Oriole in the spring of 1872, and found it rather rare in the foothills along the southwestern slopes of the Santa Catalina Mountains, in the vicinity of my camp on Rillito Creek, near Tucson, Arizona. In 1884 Mr. W. E. D. Scott was more fortunate and found this Oriole fairly common on the opposite slopes of the same mountains, some 50 miles northeast from where I had been located in 1872. He published a very interesting account of the breeding habits of this bird in "The Auk" (Vol. II, 1885, pp. 1–7), to which I refer readers for further information. In this vicinity he met with it at altitudes of from 3,000 to 8,000 feet.

Mr. Scott says: "Few birds sing more incessantly, and, in fact, I do not recall a species in the Eastern and Middle States that is to be heard so frequently. The males are, of course, the chief performers, but now and again, near a nest, while watching the birds, I would detect a female singing the same glad song, only more softly. At the earliest daybreak and all day long, even when the

sun is at its highest, and during the great heat of the afternoon, its very musical whistle is one of the few bird songs that are ever present."

Their food consists mainly of grasshoppers, small beetles, caterpillars, butterflies, larvæ, etc., as well as of berries and fruits. In Suharita Pass, between the Santa Catalina and Rincon mountains, near Tucson. Arizona I have seen them eating the ripe fig-like fruit of the giant cactus.

I found my first occupied nest of Scott's Oriole on June 4, 1872, on the dry plains southeast of my camp on Rillito Creek, fully 3 miles from the nearest water. I had previously observed some old nests attached to the tops of some tall tree yuccas, and passing a clump of these at this time, I noticed a fresh nest fastened to the leaves of one of the tallest trees. It was placed fully 10 feet from the ground, and the only way I could reach it was to stand on my horse, which I did, and secured the eggs, three in number, in which incubation had commenced. The nest was so securely fastened to the surrounding bayonet-shaped leaves that I could not pull it away, and only succeeded in cutting my hand severely in trying to do so. The nest was composed of yucca fibers, sacaton, and grama grass, and lined with a little horsehair. The upper rim of the nest was not contracted, and it was a strong, well-built structure.

A well-preserved nest, now before me, taken by Dr. A. K. Fisher, United States Department of Agriculture, near Shepherd's Canyon, Coso Valley, California, on May 11, 1891, was situated on the under side of a horizontal limb of a giant yucca (*Yucca arborescens*), about 6 feet from the ground. The edges of the leaves to which the nest was attached were hacked and lacerated so as to receive the threads and horsehair suspending it. The structure itself is substantially built of green grass and dry yucca fiber, and it is lined with finer hemp-like materials from the core of this plant. The walls and bottom of the nest are far thicker than in most Orioles' nests. Externally the nest measures $3\frac{1}{2}$ inches in depth by 5 inches in its longer diameter and 4 inches at the narrowest point. The inner cup is oval in shape, $2\frac{1}{2}$ inches deep and $3\frac{3}{4}$ by 3 inches wide. This nest, when first found, on May 7, contained two eggs; on a subsequent visit, May 11, they had disappeared, and the nest was partly pulled down.

Capt. W. L. Carpenter, United States Army, found a nest and two eggs of this species near Prescott, Arizona, on May 22, 1891, in a low, bushy pine, about 8 feet from the ground, fastened securely to a lot of pine needles among which it was built; while Mr. G. P. Wilcox found another, on June 28, 1892, containing three eggs, suspended from a limb of a small oak, near Fort Huachuca, Arizona.

While the different kinds of large tree yuccas unquestionably furnish the favorite nesting sites for this species within the borders of the United States, low trees of other species, as already stated, including junipers, are also used to a considerable extent. In Lower California, according to Mr. A. W. Anthony, it nests also in the thorny branches of the candlewood (*Fouquiera columnaris*), and Mr. Xantus reports it breeding there in bunches of moss and in hop and other vines suspended from cacti. He mentions finding one nest in a bunch of weeds growing out of a crevice in a perpendicular rock. According to Mr. L. Belding, it is known as the Mountain Oriole in Lower California.

From two to four eggs are laid (usually three), and probably two broods are raised in the more southern parts of their range in a season. They are ovate and elongate ovate in shape. The shell is thin, rather close grained, and without luster.

The ground color is pale blue, which fades considerably in the course of time, and this is blotched, streaked, and spotted, principally about the larger end of the egg, with different shades of black, mouse, and pearl gray in some specimens, and with fine claret brown, russet, ferruginous, and lavender dots and specks in others.

The average measurement of twenty-five specimens in the United States National Museum collection is 23.86 by 16.98 millimetres, or about 0.94 by 0.67 inch. The largest egg in this series measures 26.67 by 17.27 millimetres, or 1.05 by 0.68 inches; the smallest, 23.11 by 15.49 millimetres, or 0.91 by 0.61 inch.

Of the type specimens, No. 20228 (Pl. 6, Fig. 28), from a set of three eggs, Bendire collection, was taken by the writer, as already stated; and No. 25225 (Pl. 6. Fig. 29), also from a set of three, was taken by Mr. G. P. Wilcox, near Fort Huachuca, Arizona, on June 28, 1892.

## 186. Icterus cucullatus Swainson.

HOODED ORIOLE.

*Icterus cucullatus* Swainson, Philosophical Magazine, I, 1827, 436.
(B 413, C 218, R 269, C 328, U 505.)

Geographical range: Southern and eastern Mexico, north to the lower Rio Grande Valley, in Texas; south to Honduras, Central America.

The breeding range of the Hooded Oriole within the United States is rather a restricted one, being confined to the lower Rio Grande Valley of Texas, where it is an abundant summer resident.

Dr. James C. Merrill, United States Army, in his Notes on the Ornithology of Texas, published in the Proceedings of the United States National Museum (Vol. I, 1878, pp. 134, 135), says: "*Icterus cucullatus* is usually found in woods. The nests of this bird found here are perfectly characteristic, and can not be confounded with those of any allied species. They are usually found in one of the two following situations: The first and most frequent is in a bunch of hanging moss, usually at no great height from the ground; when so placed, the nests are formed almost entirely by hollowing out and matting the moss, with a few filaments of a dark, hair-like moss as lining; the second situation is in a bush (the name of which I do not know) growing to a height of about 6 feet, a nearly bare stem, throwing out two or three irregular masses of leaves at the top. These bunches of dark-green leaves conceal the nest admirably. It is constructed of filaments of the hair-like moss just referred to, with a little Spanish moss, wool, or a few feathers for the lining. They are rather wide and shallow

for Orioles' nests, and though strong they appear thin and delicate. A few pairs build in Spanish bayonets (*yucca*) growing on sand ridges in the salt prairies; here the nests are built chiefly of the dry, tough fibers of this plant, with a little wool or thistle down as lining; they are placed among the dead and depressed leaves, two or three of which are used as supports."

Mr. George B. Sennett likewise reports this as the most abundant of all the Orioles on the lower Rio Grande. He says: "They were continually peering about the thatched roof of our house and the arbors adjoining for insects; they were more familiar than any of the other Orioles about the ranch; the birds are very active and so full of song that the woods are filled with music all day long."[1]

Their food, like that of the other species of this genus, consists mainly of insects and their larvæ. The nests are mostly placed from 6 to 12 feet from the ground, rarely farther up, but Mr. Sennett reports having found some fully 30 feet high. They are most frequently placed in the hanging moss in various kinds of trees, mesquite predominating. The nests built in yuccas are usually entirely constructed of the fiber obtained from the dry leaves of this plant, which are exceedingly well adapted for this purpose, and such nests retain their shape much better than those built of moss. One now before me, in an excellent state of preservation, measures exteriorly $3\frac{1}{2}$ inches in depth by 3 inches in width; the inner cup is $2\frac{1}{2}$ inches wide by 2 inches deep. It is built throughout of yucca fiber and contains no lining.

Nidification begins in April, and the earliest record of a full clutch of eggs having been taken is April 17, a set of five; the latest was July 5; probably two broods are raised in a season. The Hooded Oriole is considerably imposed upon by both the Red-eyed and Dwarf Cowbirds, and in a few instances parasitic eggs of both species are found in the same nest. It would be interesting to ascertain which of the Cowbirds survived. Probably the young Red-eyed Cowbird proves to be too much for the smaller Dwarf Cowbird and gradually starves it to death. None of these birds winter with us; they retire farther south in October.

The number of eggs laid to a set varies from three to five, sets of four being most common, and an egg is deposited daily. They are mostly ovate in shape; the shell is delicate, rather frail, and without luster. The ground color is dull white, occasionally this has a pale buffy and again a faint bluish tint. The eggs are blotched and spotted, principally about the larger end, with irregularly shaped markings ranging from dark seal brown to claret brown, purple, mixed with ochraceous, mouse, and pearl gray, and these rarely run into lines and tracings, so prevalent in the eggs of most of our Orioles. Some eggs are fairly well marked, others only faintly; the lighter shades mentioned largely predominate over the darker ones, and in some the latter are entirely wanting.

The average measurement of ninety-three specimens in the United States National Museum collection is 21.59 by 15.24 millimetres, or 0.85 by 0.60 inch. The largest egg in the series measures 22.86 by 16 millimetres, or 0.90 by 0.63 inch; the smallest, 18.80 by 15.24 millimetres, or 0.74 by 0.60 inch.

[1] Bulletin of the U. S. Geological and Geographical Survey, 1879, Vol. V, No. 3, p. 398.

Of the type specimens, No. 20915 (Pl. 6, Fig. 30), from a set of five, taken by Dr. James C. Merrill, United States Army, near Fort Brown, Texas, on June 16, 1877, shows the most common style of markings, but these are usually heaviest about the larger end, while in this specimen, the only one I have seen so marked, they are concentrated about the smaller end of the egg. The shape of this egg is also rather peculiar, and it is the smallest in the series. No. 25343, (Pl. 6, Fig. 31), from a set of four, taken May 13, 1889, near Hidalgo, Texas, represents a rather odd and unusual style of markings; while No. 25547 (Pl. 6, Fig. 32), from a set of five, taken near Brownsville, Texas, on May 3, 1892, represents an egg above the average size and shows some of the darker colors referred to above. The last two are from the Ralph collection. The eggs figured of the Arizona Hooded Oriole will also answer for extremely heavily colored specimens of this race.

## 187. Icterus cucullatus nelsoni Ridgway.

ARIZONA HOODED ORIOLE.

*Icterus cucullatus nelsoni* Ridgway, Proceedings U. S. National Museum, VIII, No. 2, April 20, 1885, 19.

(B —, C —, R —, C —, U 505*a*.)

Geographical range: Northwestern Mexico and Lower California; north to southwestern New Mexico, Arizona, and the southern half of California, west of the Sierra Nevadas only.

The breeding range of the Arizona Hooded Oriole, also locally known in southern California as the "Palmleaf Oriole," is coextensive with its geographical distribution within the United States, and is restricted to our southwestern border from the extreme southwestern corner of New Mexico (where Dr. Edgar A. Mearns, United States Army, obtained a single specimen in the Guadalupe Canyon, near the Mexican boundary line, on October 4, 1893), which marks the eastern limit of its known range in this direction, through southern Arizona and California, north in this State to about latitude 38° 45′, where it is known to occur sparingly as far north as Auburn, Placer County. While the range of Scott's Oriole in California seems to be confined to the eastern or desert slope of the mountains, that of the Arizona Hooded Oriole appears to be strictly limited to the western slope, and it has not yet been found anywhere in the Colorado and adjoining deserts.

According to Mr. Walter E. Bryant, it is generally distributed over the Peninsula of Lower California, particularly in the vicinity of water and of human habitations. He found them on Santa Margarita Island in January. At Comondu they were nesting in the palm trees. A young one, caged, at San Fernando, was fed by the male parent.[1]

[1] Birds of Lower California, California Academy of Sciences, Vol. II, 1889, p. 295.

Within our borders it is more common in southern Arizona than anywhere else, and I found about twenty of its nests here during the spring and summer of 1872. I first noticed this handsome Oriole on April 5, when I saw several males. My attention was drawn to the bird by its peculiar, sharp, grating call, uttered while flitting through the cottonwoods and shrubbery in the Rillito Creek bottom, and I rarely saw one far away from water at any season of the year. The dense, shady groves of cottonwood and mesquite trees in the creek bottoms appeared to be its favorite haunts. It is a shy, restless creature, nearly always on the move, looking for insects of various kinds and their larvæ, including hairless caterpillars, and small grasshoppers. During the mating season, beginning about the latter part of April, several males may sometimes be seen chasing a female and scolding and fighting each other for the coveted prize.

In southern Arizona nidification begins rather late, rarely before May 20, and sometimes later. In southern California, however, it commences fully a month earlier, and a full set of eggs was taken by Mr. Theodore D. Hurd, near Riverside, California, on April 23. Mr. W. E. D. Scott found ten nests of this Oriole in a canyon in the Santa Catalina Mountains in 1884, which are fully described in "The Auk" (Vol. II, 1885, pp. 159–165). This paper gives an excellent account of its breeding habits as observed by him. His earliest nest was found on May 28 and contained three fresh eggs.

Although I searched carefully for nests of the Arizona Hooded Oriole during the entire month of May, I failed to find any until June 5, when I took the first nest, containing three fresh eggs. It was suspended from a bunch of mistletoe growing on a limb of a cottonwood tree, about 40 feet from the ground, and was hard to get at. This, like nearly all the nests found by me, was woven of a species of slender wiry grass growing in moist places, which was used in a green state. It contained a little cottonwood down for lining. Its green color, closely resembling the surrounding foliage, made it very difficult to see. It was securely fastened to several mistletoe twigs among which it was placed. Fully three-fifths of the nests found by me were placed in similar situations; the others were suspended in mesquite (excepting one found in an ash tree), at various heights from 12 to 45 feet from the ground. The majority of these nests were woven of this green wire grass, which seems admirably adapted for this purpose, and a few only were made of dry yucca fibers; the latter were much more easily seen. In some instances this material was also used for the inner lining, mixed with willow down or a little wool, rarely with a few feathers, or a small quantity of horsehair.

While some of the nests were semipensile and slung somewhat like a hammock, so that they rocked like a cradle with every breeze, in the majority some of the surrounding slender twigs among which the nest was placed were incorporated into its walls and sides, securing it almost immovably in position. None of the nests seen by me in any way resembled those of Bullock's Oriole, which was also common here. They were always much brighter colored, not nearly so deep, and were constructed of entirely different materials. Neither do the grass-woven nests of the Arizona Hooded Oriole resemble the common type of its near relative found in Texas. I refer to the nests built of tree moss, which

are usually located in bunches of the same material. But those of either form of the Hooded Oriole, when built of yucca fibers, might be readily mistaken for each other. Besides the trees already mentioned, Mr. Scott found it breeding in sycamores, and in California it nests in walnut, willow, cypress, gum, and fan palms (*Washingtonia filicera*), the fibers of which, according to Mr. Theo. D. Hurd, are almost exclusively used as nesting material in that locality.

Mr. Hurd published the following interesting notes on the nesting habits of this Oriole, as observed by him in that vicinity: "For the rearing of the first brood the nests are usually suspended in overhanging branches of the blue gum (*Eucalyptus globulus*), but it is a noticeable fact that the second nests are more commonly attached to the leaves of the palm tree. Why this is I do not know, unless they want to begin laying as soon as possible, and therefore build where material is most easily obtained. When in palms the nests are fastened directly to the under side of a large leaf, leaving a small opening on one or more often on either side, for the bird to enter."[1]

Mr. R. H. Lawrence took a nest of this Oriole containing four eggs near Monrovia, California, on May 19, 1893; this nest, which he kindly sent to me, was attached to the under side of a banana leaf, about 9½ feet from the ground. Two other nests were subsequently met with in similar situations, one of these probably belonging to the pair whose eggs had been previously taken.

Two and possibly even three broods are sometimes raised in a season. I found slightly incubated eggs in Arizona on August 25. From three to five eggs are laid to a set; in Arizona usually only three or four; but Mr. Hurd reports taking a set of seven on May 6, 1890. An egg is deposited daily until the set is completed. The Arizona Hooded Oriole is imposed upon to a considerable extent by the Dwarf Cowbird, and I found several nests containing one and two eggs of this parasite with one or two only of the rightful owner.

Incubation lasts from twelve to fourteen days. I do not know whether the male assists in this duty, but have seen him carrying nesting materials. The nest is well built, it is basket or cup shaped, with a very thick bottom and strong sides. It averages about 4 inches in height externally. The inner cup is oval, about 2½ inches deep and 3 by 2 inches wide, and it takes about four or five days to complete it.

The eggs resemble those of the Hooded Oriole in general shape and ground color, but a few approach a decided elongate ovate; as a rule they are better marked, and the darker shades predominate over the lighter ones; they also show more of a tendency to run into zigzag markings, as do the majority of Oriole's eggs.

The average measurement of thirty specimens in the United States National Museum collection is 21.59 by 15.37 millimetres, or about 0.85 by 0.61 inch. The largest egg in the series measures 24.13 by 15.24 millimetres, or 0.95 by 0.60 inch; the smallest, 18.03 by 13.21 millimetres, or 0.71 by 0.52 inch.

[1] Ornithologist and Oologist, Vol. XV, 1890, p. 13.

The type specimen, No. 20225 (Pl. 7, Fig. 1), from a set of three eggs, Bendire collection, was taken by the writer on Rillito Creek, near Tucson, Arizona, on July 17, 1872, and represents a well-marked specimen; while No. 20227 (Pl. 7, Fig. 2), also from a set of three, taken by the writer in the same vicinity, on August 25, 1872, represents a handsome and peculiar style of coloration, which is also occasionally found among the eggs of the Hooded Oriole, but not often among either.

## 188. Icterus spurius (Linnæus).

ORCHARD ORIOLE.

*Oriolus spurius* Linnæus, Systema Naturæ, ed. 12, I, 1766, 162.
*Icterus spurius* Bonaparte, Journal Academy Natural Sciences, Phila.; III, 1823, 363.
(B 414, C 215, R 270, C 324, U 506.)

Geographical range: Eastern United States; north to the southern border of the Dominion of Canada, regularly to southern Ontario, casually to southern New Brunswick; west to eastern North and South Dakota, Nebraska, eastern Colorado, Kansas, the Indian Territory, and Texas; south in winter through Central America to Panama.

The breeding range of the Orchard Oriole is confined to the eastern and central parts of the United States, reaching from northern Florida along the Gulf coast west to the lower Rio Grande Valley, in Texas; thence north (excepting the northwestern parts of this State) through the Indian Territory, Kansas, and Nebraska, to eastern South and North Dakota. In the Mississippi Valley it reaches about the northern limits of its range in Minnesota and southern North Dakota, in about latitude 46°, while along the Atlantic coast, in the New England States and in New York, it is rarely met with north of latitude 42°. It breeds sparingly in southern Ontario, in the Dominion of Canada, and undoubtedly also to some extent, in favorable localities, somewhat farther north than the points indicated above, especially so in Minnesota; it may also breed in small numbers in eastern Colorado. Mr. Frank M. Chapman reports it as a rare summer resident at Gainesville, Florida. Its center of abundance is to be found in the States bordering the Mississippi Valley.

Throughout its range in the United States it is only a summer visitor, and none remain with us during the winter. It reenters our southern border about April 1, moving leisurely northward and reaching its more northern breeding grounds from a month to six weeks later, according to the season, the males usually preceding the females by several days.

The Orchard Oriole, though far less brilliantly colored than its eastern congener, the Baltimore Oriole, is equally well known though not quite as conspicuous. It is a restless, impulsive, but well-dispositioned bird, on good terms with its neighbors, and, though not particularly shy, it is nevertheless difficult to observe closely, as it generally conceals itself in the densest foliage while at rest, or else flits quickly about from twig to twig in search of insects, on which it lives almost exclusively throughout the summer months.

Its favorite haunts, as its name implies, are orchards, and when the apple and pear trees are in bloom and the trees have commenced to leaf one may look for the Orchard Oriole. It is generally found in rather open country, interspersed here and there with small groves; also among the shade trees along country roads, and in the prairie States among the trees and shrubbery along streams, preferring such localities to heavier-timbered sections and forest regions.

Its song, most often heard in the earlier spring, is uttered in a quick, hurried manner. Its loud, clear strains, indicating its impulsive nature, are poured forth with such rapidity as to be difficult to describe, and I shall not attempt it; but they remind me somewhat of those of the Warbling Vireo, only sounding louder and clearer. A chattering, querulous note, when disturbed or alarmed from any cause, is also uttered.

Few birds do more good and less harm than our Orchard Oriole, especially to the fruit grower. The bulk of its food consists of small beetles, plant lice, flies, hairless caterpillars, cabbage worms, grasshoppers, rose bugs, and larvæ of all kinds, while the few berries it may help itself to during the short time they last are many times paid for by the great number of noxious insects destroyed, and it certainly deserves the fullest protection.

Excepting in the extreme southern parts of its range nest building does not begin much before May 10, and even there it is often protracted till after the middle of the month. In southern New York, Pennsylvania, southern Michigan, and Minnesota full sets of fresh eggs may ordinarily be looked for from May 25 to June 10, while on the lower Rio Grande, in Texas, fresh sets are occasionally taken during the first week in May, but more frequently not until about the middle of this month. Both sexes assist in nest building, and generally finish one in from three to four days. The nests are placed in trees or bushes, from 6 to 40 feet from the ground, usually from 12 to 20 feet, in a great variety of trees, less often in conifers than in deciduous kinds. Apple, pear, sweet gum, different kinds of oaks, sycamore, elm, cottonwood, maple, walnut, mesquite, hackberry, prickly ash, cedar, and pine are a few of the many selected as nesting sites. In the South the Orchard Oriole nests occasionally in the gray moss (*Tillandsia usneoides*) so commonly found hanging from many of the trees there. The late Dr. William C. Avery, of Greensboro, Alabama, sent me a beautiful nest of this species, built in a bunch of such moss, pending from a post oak, about 25 feet from the ground, and taken on May 27, 1891. A suitable cavity was fashioned in the moss, and this is well lined with the wiry green grass which is nearly always used by the Orchard Oriole in the construction of its nests. The inside is sparingly lined with plant down. To what extent this mode of building prevails I am unable to tell, but I believe it is rather unusual, even in localities where this moss is abundant.

The location and manner of attaching its ingeniously woven, basket-like nests vary greatly. Some are set in a crotch formed by several small twigs; the bottom of the nest occasionally rests on and is supported by these, and again in similar locations it is unsupported, but the sides are securely fastened to several of the twigs among which it is placed; then again some are built in a

fork of a horizontal limb, like the nest of an Acadian Flycatcher or a Vireo, both sides of the nest being fastened to the fork in which it is placed; again it may be fastened to some suitable twigs by the rim only, in the manner of a hammock. Comparatively few, excepting those of the last style and those built in moss, can really be called pensile or even semipensile nests. They also vary greatly in bulk and depth.

A well-preserved nest from the Ralph collection, No. 25347, taken on Shelter Island, Suffolk County, New York, on June 3, 1880, contained six eggs when found. It was placed in an upright fork of a small branch in a thorn pear tree, about 10 feet from the ground, and is composed of wiry grass used while green, and is only slightly lined with plant down. The outer diameter at the widest part, a little below the middle of the nest, is 4½ inches; the outside depth is 4 inches. The upper rim of the nest is somewhat contracted; the inner cup is 3 inches deep by 2½ inches in diameter. The sides are thick and securely fastened to several branches, but the bottom does not come within 2 inches of the fork of the crotch in which it is placed. Another nest, No. 26294, taken by Mr. H. P. Attwater, on the St. Charles Peninsula, near Rockport, Aransas County, Texas, on May 16, 1893, contained six eggs, and was placed in an upright crotch of a mesquite tree, 8 feet from the ground, and only 25 yards from salt water. This is much slighter built, and measures only 3 by 3 inches in outer diameter; the inner cup is 2½ inches deep and 2 inches wide; the upper rim of the nest is also somewhat contracted. This is likewise constructed of fine, wiry grass, and is apparently lined with a little thistle down. The nests taken in the South appear to be much less bulky than those from the northern parts of its breeding range.

Many of these nests retain their bright pea-green color for years. Mr. D. B. Burrows writes me that some nests of this species, which he found in Starr County, Texas, were so well lined with cotton that the interior had a beautiful, smooth, pure white appearance. In the northern parts of its range the Orchard Oriole is more or less imposed upon by the Cowbird; and Mr. Burrows informs me that on the lower Rio Grande, in Texas, its nests oftener contain parasitic eggs of both the Red-eyed and Dwarf Cowbirds than any other species noticed by him. The Orchard Oriole is a very social bird and does not object to other species nesting in the same tree with it; it seems to be on especially good terms with the Kingbird. Most of its time is spent in trees, and it is rarely seen on the ground. Its flight is swift, easy, and graceful.

From four to six eggs are usually laid to a set (mostly five) and one is deposited daily. Incubation lasts about twelve days, and I am of the opinion that this duty is exclusively performed by the female. I have never seen the male on the nest, but have seen him feed his mate while incubating. I believe as a rule only one brood is raised in a season. Both parents show equal solicitude and devotion in the care and defense of their young from prowling enemies, and will boldly and furiously attack any intruder. In the northern parts of its range the fall migration begins sometimes in the latter part of July, usually in

the beginning of August, comparatively few birds remaining at the end of this month.

The eggs are mostly ovate in shape, but occasionally a set is found which is decidedly elongate ovate. The shell is moderately strong, close grained, and without gloss. The ground color is usually pale bluish white, and this is sometimes faintly overlaid with pale pearl gray or grayish white. The markings, which are nearly always heaviest about the larger end of the egg, consist of blotches, spots, scrawls, and tracings of several shades of brown, purple, lavender, and pearl gray, varying in amount and intensity in different specimens. In the majority of the eggs before me the darker markings predominate, but the lighter-colored and more neutral tints are nearly always present to a greater or less extent.

The average measurement of one hundred and thirty-three specimens in the United States National Museum collection is 20.47 by 14.54 millimetres, or about 0.81 by 0.57 inch. The largest egg in the series measures 22.35 by 15.24 millimetres, or 0.88 by 0.60 inch; the smallest, 18.03 by 14.22 millimetres, or 0.71 by 0.56 inch.

The type specimen, No. 21670 (Pl. 7, Fig. 3), Bendire collection, from an incomplete set taken by Mr. A. J. Dayan, near New Haven, Connecticut, is a very peculiarly and oddly marked egg, and is figured on this account. No. 24864 (Pl. 7, Fig. 4), from a set of five taken in Chatham County, Georgia, May 21, 1890, and presented by Mr. W. F. Webb, represents a rather heavily marked specimen; while No. 25550 (Pl. 7, Fig. 5), Ralph collection, from a set of four, taken in Cameron County, Texas, May 10, 1892, represents a rather light-colored and an average-marked egg.

## 189. Icterus galbula (Linnæus).

BALTIMORE ORIOLE.

*Coracias galbula* Linnæus, Systema Naturæ, ed. 10, 1758, 108.
*Icterus galbula* Coues, Bulletin Nuttall Ornithological Club, V, 1880, 98.
(B 415, C 216, R 271, C 326, U 507.)

Geographical range: Eastern North America; north to the southern border of the Dominion of Canada, from Nova Scotia and southern New Brunswick westward through Ontario and Manitoba to Saskatchewan, where it reaches the northern known limits of its range in latitude 55°; west to eastern Assiniboia, the eastern parts of Montana, Wyoming(?), Colorado, and Texas; south in winter through eastern Mexico and Central America to Panama. Accidental at York Factory, Keewatin, Dominion of Canada, the Island of Cuba, and the Shetland Islands, Europe.

Within the borders of the United States the breeding range of the Baltimore Oriole, also variously known as "Golden Robin," "Fire-bird," "Pea-bird," "Hanging-bird," and "Hang-nest," is nearly coextensive with its geographical distribution, with the exceptions that it does not appear to breed at all in southern Florida and is generally rare in the immediate vicinity of the Gulf coast.

n Texas, during the breeding season, it is found only in the more eastern portions of the State, and appears to be rare even there, excepting in the northeastern part. It is a common summer resident in the Indian Territory and Kansas, while in eastern Colorado and Montana it must be considered as rare. It passes beyond our border into eastern Assiniboia, and is common in Manitoba, reaching the northern limits of its range in the interior in Saskatchewan, where Capt. T. Blakiston met with it in latitude 55° N. Thence to the eastward it is common in Ontario, but becomes rarer toward the Atlantic coast, and is only met with in small numbers in southern New Brunswick, where it is reported to breed regularly near Woodstock, on the St. John's River, and it has been taken near Halifax, Nova Scotia, and also probably nests here to a limited extent.

In northern Maine the Baltimore Oriole is rather rare. Mr. Manly Hardy, of Brewer, writes under date of April 29, 1891: "We find many species of birds here now which were not found thirty years ago, and others are slowly moving this way. I find that certain species do not advance eastward faster than from 2 to 5 miles a year. The Baltimore Oriole reached here thirty-odd years ago, but was found on the Kennebec River, 50 miles west, twenty-five years previously, and I am certain that it was in Bangor three years before it crossed the river to Brewer, and, although a regular visitor here now, I have not seen it even a mile east of here as yet."

The Baltimore Oriole is a common and well-known bird throughout our Eastern, Middle, and Northern States. In the Upper Mississippi Valley it has greatly increased in numbers within the last thirty years, since the country has been settled, and it appears to be holding its own in the East where many other species are slowly decreasing. This is undoubtedly due to its great popularity in our rural districts, where its beneficial qualities are pretty generally understood. Aside from its showy plumage, its sprightly and pleasing ways, its familiarity with man, and the immense amount of good it does by the destruction of many noxious insects and their larvæ, including hairless caterpillars, spiders, cocoons, etc., it naturally and deservedly endears itself to every true lover of the beautiful in nature, and only a short-sighted churl or an ignorant fool would begrudge one the few green peas and berries it may help itself to while in season. It fully earns all it takes, and more too, and especially deserves the fullest protection of every agriculturist.

The Baltimore Oriole usually arrives in the southern New England States, in central New York, and Minnesota, with almost invariable regularity, about May 10, rarely varying a week from this date; it arrives correspondingly earlier or later farther south or north. About this time the trees have commenced to leaf, and many of the orchards are in bloom, so that their arrival coincides with the loveliest time of the year. The males usually precede the females by two or three days to their breeding grounds, and the same site is frequently occupied for several seasons, and not infrequently the same nest. It is very much attached to a locality when once chosen for a home, and is loath to leave it. Few birds are more devoted to each other than these Orioles, and I am of the opinion that they remain mated through life. Their favorite haunts in our

Eastern States are found in rather open country, along roads bordered with shade trees, creek bottoms, orchards, and the borders of small timbered tracts. It is equally at home in villages or cities of considerable size, as long as they furnish suitable trees for nesting sites. It shuns swampy and marshy tracts and extensive forests.

A very peculiar note, a long-drawn-out, chattering "chaë, chaë, chaë," is apt to draw one's attention to it on its first arrival, and this is more or less frequently uttered throughout the season. This note is difficult to reproduce exactly, and I find its songs still more so. One sounds somewhat like "hioh, hioh, tweet, tweet;" another something like "whee-he-he, whee-he-he, oh whee-he-he-woy-woy." This last is much more softly uttered than the first. Mr. T. Nuttall describes one of their songs as "tshippe-tshayia-too-too-tshippe-tshippa-too-too," and there are others impossible to render. The young, after leaving the nest, utter a note like "he-he-häe," and another like "heek-heek-he," varied occasionally by a low twittering. Shortly after their arrival they sing almost incessantly when not eating; but later in the season, when they have their always hungry family to provide for, they are more silent. Their flight is strong, swift, and graceful, and they are far more at home on the wing than on the ground, where they are seldom seen except when picking up some insect or in search of nesting material.

In the vicinity of Washington, District of Columbia, nidification commences about the middle of May, and full sets of eggs may be looked for the last week in this month, while in central New York, Connecticut, Wisconsin, southern Minnesota, etc., they usually nest from eight to fourteen days later.

Few of our native birds build a more ingeniously constructed nest than the Baltimore Oriole, and it must always be considered a most interesting example of bird architecture, taking time, intelligence, and good judgment to construct, and from five to eight days are usually required for its completion.

Some nests show a great superiority over others in general make-up and workmanship, and are perhaps the product of old and experienced birds, while the younger ones, from lack of judgment, often select poor sites, or else secure their nests carelessly to the supporting twigs, so that many are destroyed before the young reach maturity.

Ordinarily the nest of the Baltimore Oriole is pensile, and is usually suspended by the rim from the extremities of several slender branches, to which it is attached. Others, besides being fastened by the rim, which is always neat and smoothly finished, are attached to some perpendicular fork or limb by one of the sides, thus steadying the nest and preventing it from swinging too much during heavy winds. In a truly pensile nest some of the eggs are occasionally cracked by the violent swaying of the slender twigs to which it is attached, while if fastened at the side this occurs very rarely, unless the entire limb is torn off. Both sexes assist in nest building. The materials used for the framework consist principally of decayed fibers, such as those of the Indian hemp (*Apocynum androsæmifolium*), the silk of milkweed (*Asclepias*), nettles (*Urtica*), and, when located near human habitations, of horsehair, bits of twine, yarn,

strips of grapevine bark, etc. With such materials a strong purse or pouch-shaped nest is woven and firmly attached to one or more forked twigs by the slightly contracted rim, and it is usually placed in such a position that the entrance is well shaded by leafy twigs above. All sorts of materials are used in lining the bottom and sides of the nest—cotton, wool, tow, rags, cattle hair, fur, fine strips of bark, tree moss, fine grass, and plant down. They readily avail themselves of any suitable materials, such as yarn, which may be thrown out to them, but prefer plain to gaudy colored stuffs. I have a nest before me which has a couple of tassels, made of white cotton twine, pending loosely from the side of the nest. This nest, No. 25112, was taken by Mr. H. P. Attwater, near Chatham, Ontario, in June, 1886. It is firmly attached to and pendant from three small twigs, and is composed of twine, horsehair, and plant fibers; the walls, although rather thin, are greatly strengthened by the quantity of horsehair used. It is externally 5 inches deep, and the entrance, which is oval in shape, measures $3\frac{1}{4}$ by 2 inches in diameter. The cup is $4\frac{1}{2}$ inches deep by $2\frac{1}{2}$ inches wide. This is a truly pensile nest. Another, No. 25904, taken by Mr. Otto Widmann, near St. Louis, Missouri, on May 31, 1884, an exceedingly well-built example, was suspended from some small twigs growing out of an upright fork of an elm branch about half an inch thick and some 25 feet from the ground, it was also fastened to one branch of the fork for nearly the entire depth of the nest. It measures 9 inches in length by 5 inches in external diameter, and is nearly cylindrical in shape. It is fully 5 inches deep and 3 inches wide inside. The opening of the nest was well protected from above by several small, leafy twigs; a few long streamers of hemp-like fibers hang down from the sides and bottom. The inside is lined with horsehair and plant down. Although rather slovenly looking from the outside, this is by far the best built nest of this species I have seen. The color of some of the nests varies considerably according to the materials used; some look almost white, others a pale straw color, and the majority smoke gray. In the South the Baltimore Oriole, like the preceding species, builds occasionally in bunches of the gray moss (*Tillandsia usneoides*).

The nests are usually suspended from long, slender, drooping branches of elm, maple, birch, weeping willow, buttonwood, sycamore, oak, aspen, poplar, Norway spruce, apple, pear, and wild cherry trees; but in some localities they are frequently built in the very top and center of a tree, where it is almost impossible to see them. They are placed at various heights from the ground, from 8 to 50 feet and more, and frequently in utterly inaccessible positions. The Baltimore Oriole is tolerant and amiably disposed toward its smaller neighbors, and such are often allowed to nest in the same tree, and occasionally within a few feet of its own nest.

Incubation lasts about fourteen days, and I think the female attends to this duty almost exclusively. Both sexes are extremely devoted to each other, as well as to their eggs and young, defending these bravely against all intruders. From four to six eggs are laid to a set, most frequently four, though sets of five are not uncommon, while sets of six are rather rare. One is deposited daily, and only one brood is raised in a season. The young are able to leave the nest when

about two weeks old, and may then be seen sitting on some of the branches close by and clamoring for food. They are fed entirely on insects, etc., and are faithfully cared for by the parents until able to provide for themselves. The migration from the northern sections of their breeding range to their winter homes in Central America begins usually in August, but occasionally some birds linger until September. This species is rarely imposed on by the Cowbird. The eggs of the Baltimore Oriole are usually elongate ovate in shape, more rarely ovate. The shell is fine grained, moderately strong, and shows but little gloss.

The ground color is ordinarily pale grayish white, one of those subtle tints which is difficult to describe; in a few cases it is pale bluish white, and less often the ground color is clouded over in places with a faint, pale ferruginous suffusion. The egg is streaked, blotched, and covered with irregularly shaped lines and tracings, generally heaviest about the larger end of the egg, with different shades of black and brown, and more sparingly with lighter tints of smoke, lavender, and pearl gray. In a few instances the markings form an irregular wreath, and occasionally a set is found entirely unmarked.

The average measurement of fifty-six eggs in the United States National Museum collection is 23.03 by 15.45 millimetres, or about 0.91 by 0.61 inch. The largest egg of the series measures 25.91 by 16.76 millimetres, or 1.02 by 0.66 inches; the smallest, 20.83 by 14.99 millimetres, or 0.82 by 0.59 inch.

Of the type specimens, No. 22644 (Pl. 7, Fig. 6), from a set of four, taken by the late Capt. B. F. Goss, near Pewaukee, Wisconsin, on June 7, 1872, shows a rather unusual type of markings; No. 25557 (Pl. 7, Fig. 7), from a set of five, Ralph collection, taken on Shelter Island, New York, June 10, 1882, represents one of the finer and more profusely marked examples; No. 25558 (Pl. 7, Fig. 8), also from a set of five, taken by Dr. William L. Ralph, near Holland Patent, New York, June 3, 1887, shows the coarser style of markings and a rather dark ground color; and No. 25846 (Pl. 7, Fig. 9), from a set of four, taken on June 7, 1887, by the same collector and at the same place as the last, shows a specimen in which the markings are mainly confined to the center of the egg.

## 190. Icterus bullocki (Swainson).

BULLOCK'S ORIOLE.

*Xanthornus bullocki* Swainson, Philosophical Magazine, I, 1827, 436.
*Icterus bullocki* Bonaparte, Geographical and Comparative List, 1838, 29.

(B 416, C 217, R 272, C 327, U 508.)

Geographical range: Western North America; north to southern British Columbia, southern Alberta, and Assiniboia, Dominion of Canada; east to western North and South Dakota, western Nebraska, eastern Colorado, and western Texas; Lower California; south in winter into the valley of Mexico and to Puebla. Accidental in Maine.

Bullock's Oriole, a species as handsome and conspicuous as the preceding one, replaces it in the western portions of the United States, and is likewise widely distributed. Its breeding range within our borders corresponds to its dis-

tribution. It is only a summer resident with us, arriving usually from its winter haunts in Mexico during the last half of March, and moving slowly northward, reaches the more northern parts of its breeding range from a month to six weeks later. It appears to be much rarer in the immediate vicinity of the seacoast than in the Great Basin regions, where it is common nearly everywhere, especially if sufficient water is found to support a few stunted cottonwoods and willows. During my extensive wanderings through nearly all of the States west of the Rocky Mountains, and extending from the Mexican to the British borders, I have met with this species almost everywhere in the lowlands, and in some localities have found it very abundant. Like the Baltimore Oriole, it avoids densely wooded regions and the higher mountains. It is especially abundant in the rolling prairie country, traversed here and there by small streams having their sources in some of the many minor mountain ranges which are such prominent features of the landscape in portions of Idaho, Washington, and Oregon. These streams are fringed with groves of cottonwood, mixed with birch, willow, and alder bushes, which are the favorite resorts of this Oriole during the breeding season. The immediate vicinity of water is, however, not considered absolutely necessary, as I have found it nesting fully a mile or more away from it on hillsides, the edges of table-lands, and in isolated trees or even in bushes. In Colorado it is said to be found at altitudes of over 8,000 feet, but as a rule it prefers much lower elevations. I also met with it at Fort Custer, Montana, where, however, it was not common, and along the eastern border of its range it overlaps that of the Baltimore Oriole for considerable distances. In western Texas it is common and breeds as far south as the mouth of the Rio Grande. It also breeds in northern Lower California and northern Mexico. In southern Arizona and New Mexico I found it not uncommon, but not nearly as abundant as in eastern Oregon and in Idaho, where it was present everywhere in suitable localities. In the vicinity of Fort Lapwai, Idaho, it was especially abundant, and, although suitable nesting sites were by no means scarce, I have seen three occupied nests of this Oriole in a small birch tree close to a nest of the Arkansas Flycatcher, showing them to be very sociable birds. Near Camp Harney, Oregon, a Swainson's Hawk, an Arkansas Flycatcher, and a pair of this species nested in the same tree, a good-sized pine. Dr. A. K. Fisher tells me that he saw hundreds of these nests in a large row of cottonwoods, east of Phœnix, Arizona, in June, 1892.

The call notes of Bullock's Oriole are very similar to those of the Baltimore, but its song is neither as pleasing to the ear nor as clear and melodious as that of the latter. Its food is similar, and consists principally of insects and a few wild berries. Nidification begins late in May, and fresh eggs may be looked for throughout the greater part of its range during the first week in June. In southern California, Arizona, and southwestern Texas a few breed sometimes by May 15, but rarely earlier.

The nest resembles that of the Baltimore Oriole, but as a rule it is not quite as pensile, and many are more or less securely fastened by the sides as well as by the rim to some of the adjoining twigs. The general make-up is

similar. As many sections where Bullock's Oriole breeds are still rather sparsely settled, less twine and such other material as may be picked up about human habitations enter into its composition. Shreds of wild flax and other fiber-bearing plants and the inner bark of the juniper and willow are more extensively utilized; these with horsehair and the down of plants, wool, and fine moss, furnish the inner lining of the nests. According to my observations, the birch, alder, cottonwood, eucalyptus, willow, sycamore, oak, pine, and juniper furnish the favorite nesting sites; and in southern Arizona and western Texas it builds frequently in bunches of mistletoe growing on cottonwood and mesquite trees.

The nests are usually placed in low situations, from 6 to 15 feet from the ground, but occasionally one is found fully 50 feet up. A very handsome nest, now before me, taken by Dr. Edgar A. Mearns, United States Army, near Fort Hancock, Texas, on June 30, 1893, just after the young had left it, is placed among six twigs of mistletoe, several of these being incorporated in the sides of the nest, which is woven entirely of horsehair and white cotton thread, making a very pretty combination. The bottom of the nest is lined with wool. Outwardly it is 6 inches deep; inside, 4½ inches. The entrance, at the top, is oval in shape, somewhat contracted, and 4 by 2½ inches wide. Another peculiar specimen before me, taken near Yreka, California, May 29, 1860, is woven among and fastened to a bunch of needles of the long-leafed pine; this nest resembles an inverted cone, and is quite unique in structure. I have also seen double nests, one placed beside and fastened to one previously built that had for some unknown reason been abandoned.

The number of eggs to a set varies from three to six; sets of five and four are perhaps most common, while those of six are not very rare. Bullock's Oriole is occasionally imposed upon by the Dwarf Cowbird in Arizona, and by this as well as the Red-eyed Cowbird in southern Texas. Only one brood is raised in a season, and the duties of incubation, which are performed almost exclusively by the female, last about fourteen days. I have often watched the sitting bird, and have never seen the male on the nest. At Camp Harney a number bred at the Post, within a few yards of the houses, and when not molested they soon became as familiar as the Baltimore Oriole. The sexes are extremely devoted to each other, and valiantly defend their eggs and young. I once saw a pair vigorously attack a Richardson's squirrel (*Sciurus richardsoni*), which evidently was intent on mischief, and drive it out of the tree in which they had their nest. Both birds acted with the greatest courage and dashed at it repeatedly with fury, the squirrel beating a hasty retreat from the combined attack. The young are large enough to leave the nest in about two weeks, and are diligently guarded and cared for by both parents until able to provide for themselves. The return migration in the more northern portions of their range to their winter homes in Mexico begins usually in the first half of August, and by the end of this month nearly all have departed.

The eggs are mostly elongate ovate in shape, a few are ovate, and an occasional set is almost wedge-shaped or cuneiform. The shell is close grained and

only slightly glossy. The ground color is generally of the same subtle grayish-white tint as that seen in the eggs of the Baltimore Oriole, but the proportion of the pale bluish white eggs is greater than with the latter. Occasionally the ground color is pale vinaceous buff. The markings are similar in color to those found on the eggs of the preceding species, but as a rule they are not so coarse, and the fine hair lines running in irregular tracings around the larger axis of the egg are more prevalent; they are also a trifle larger.

The average measurement of one hundred and forty-four specimens in the United States National Museum collection is 23.80 by 15.93 millimetres, or about 0.94 by 0.63 inch. The largest egg in the series measures 25.40 by 16.76 millimetres, or 1 by 0.66 inch; the smallest, 21.34 by 15.24 millimetres, or 0.84 by 0.60 inch.

Of the type specimens, No. 20208 (Pl. 7, Fig. 10), from a set of four, Bendire collection, taken by the writer at Fort Lapwai, Idaho, on June 6, 1871, shows the peculiar vinaceous buff ground color referred to above; No. 20211 (Pl. 7, Fig. 11), from a set of three, in which incubation was advanced, from the same collector and place, taken June 15, 1871, represents a peculiarly shaped and very handsomely marked egg; No. 20218 (Pl. 7, Fig. 12), from a set of five, taken by the writer at Camp Harney, Oregon, on June 10, 1877, shows some unusually heavy markings; while No. 25551 (Pl. 7, Fig. 13), from a set of four, in the Ralph collection, taken near Brownsville, Texas, May 27, 1891, represents about an average-marked egg and a rather clear ground color.

## 191. Scolecophagus carolinus (Müller).

RUSTY BLACKBIRD.

*Turdus carolinus* Müller, Systema Naturæ, Supplement, 1776, 140.
*Scolecophagus carolinus* Ridgway, Proceedings U. S. National Museum, VIII, 1885, 356.
(B 417, C 221, R 273, C 331, U 509.)

Geographical range: Mainly Eastern North America; from Florida and the Gulf coast north through the Eastern United States and the Dominion of Canada to Labrador, Keewatin, the Northwest Territory and northern Alaska to the shores of Bering Sea; west in the United States to Texas and the Great Plains, and occasionally to the eastern slopes of the Rocky Mountains. Accidental in Lower California and in Greenland.

The breeding range of the Rusty Blackbird, also commonly known as the "Rusty Grackle," is a rather limited one within our borders. As far as known it breeds only in portions of Vermont, New Hampshire, and Maine, and in the Adirondack wilderness, reaching the most southerly point of its breeding range in Herkimer County, New York, in about latitude 43°, where it is strictly confined to the mountainous regions and is rather rare. Somewhat farther north, in the vicinity of Big Moose Lake, Dr. C. Hart Merriam reports it as a common summer resident. It may possibly breed on the west shore of Lake Superior, in northeastern Minnesota, but there are no records at hand from there. As one advances north into the Dominion of Canada it becomes more

common in suitable localities, and its center of abundance during the breeding season must be looked for north of latitude 58°, and it extends thence to the tree limit. The most northern point at which it has yet been found is Putnam River, Alaska, where specimens were taken by Lieut. G. M. Stoney, United States Navy. Its breeding range is known to extend from Labrador in a northwesterly direction clear across the continent to the shores of Bering Sea, and as it covers such an immense tract of country, I doubt if it is very common anywhere.

The Rusty Grackle is much more of a forest-loving species than the other Blackbirds, and during the breeding season it appears to be far less gregarious. Its favorite haunts in the Adirondacks are the swampy and heavily wooded shores of the many little mountain lakes and ponds found everywhere in this region, and here it spends the season of reproduction in comparative solitude. I can state from personal experience that the oölogist who desires to study this species on its breeding grounds must make up his mind to endure all sorts of discomforts; millions of black flies, gnats, and mosquitoes make life a burden during his stay, while the bogs and swamps through which one is compelled to flounder in search of the nest render walking anything but pleasant, and I am not at all surprised that genuine eggs of this species are still desiderata in most collections.

The Rusty Blackbird spends its winters mostly in the Middle and Southern States, and is one of the earliest migrants to return to its breeding grounds. It arrives in the more southern portions of its breeding range usually late in March or early in April, before the ice in the lakes has broken up and the trees have commenced to sprout; and even on the Yukon River, Alaska, it has been seen as early as April 10. Its food during the summer months consists principally of insects of various kinds, such as caterpillars, moths, grasshoppers, etc., small mollusks, worms, wild berries, and small seeds. In winter this species feeds more on grain and may be seen occasionally about barns and stock yards and in corn and rice fields, usually in small flocks by themselves, but sometimes in company with other Blackbirds. Their mode of flight resembles that of the Red-winged Blackbirds, and when feeding, while moving along, the rearmost fly over the others and alight again in the front ranks. Their notes are much more musical than those of the Grackles or other Blackbirds. The ordinary call note sounds like "tchäck, tchäck," several times repeated; another is like "turulee, turulee, turulee," uttered in a clear tone, and varied occasionally to "trallahee, trallahee."

Mr. J. W. Preston writes: "On an early spring day, while I was waiting in a sheltered wood, a good-sized flock of Rusty Blackbirds settled in some low trees about me, and as I was standing quietly by a large tree they did not see me. The wind whistled loudly through the branches above, but these lively fellows began a serenade so joyous and full of gleeful abandon that I lingered long to hear them. In singing they opened the bill widely and the throat swelled with melody. Their notes are rich, varied, and energetic. They are almost constantly in

motion, chasing each other or flying from perch to perch, singing merrily most of the time."

In the more southern portions of its breeding range, in Herkimer County, New York, nidification commences as early as the last week in April. Dr. William L. Ralph found a nest containing four fresh eggs on May 7, 1886, but it usually commences laying here about the middle of this month, and if the first set of eggs is taken, a second one may be looked for about two weeks later. With a set of five eggs in the Ralph collection, taken on May 27, 1892, in which incubation had slightly advanced, the following remarks are entered on the data blank belonging to it: "When I reached the nest I found the female bird dallying with two males, fluttering her wings, raising her tail above her back, and calling to them. All three finally flew to the nest and made a great deal of noise in the clump of trees in which it was situated and on the mossy ground beneath. At first the female appeared to care more for the attentions of the males than she did for her nest, but as soon as I began taking the eggs she and one of the males made a great fuss and attempted to scare me away. I think the other male was one of a pair to which a deserted nest belonged, found May 12, containing two cold, wet eggs; the female had probably been killed."

Through the kindness of Dr. Ralph I had an opportunity of observing a pair of these birds, and also their nest and eggs, in the spring of 1893, the only ones nesting in that vicinity.

Dr. C. Hart Merriam found it breeding on the north branch of Moose River, near Big Moose Lake, New York, on June 15, 1883, and presented me a handsome set of four eggs taken by him there. The nest was placed in a winterberry or black elder bush (*Ilex verticillata*), 3 feet from the ground, near the edge of a stream.

Mr. W. G. Winton took a nest and eggs near the Stewiacke River, Nova Scotia, in 1860, and these eggs are now in the United States National Museum collection.

Mr. W. L. Bishop, of Kentville, Nova Scotia, informs me that he found the Rusty Blackbird breeding there as early as May 5, and that he thinks only one brood is raised in a season.

Messrs. E. W. Nelson and L. M. Turner both report it common on the Yukon River, Alaska, and several eggs taken near Fort Yukon are now in the collection here. The latter naturalist also took young birds near Fort Chimo, Ungava, on July 10, 1884. Here they frequented swampy tracts in which a few isolated spruce and larch trees grew.

Prof. Winfred A. Stearns says that in Labrador "the Rusty Blackbird had a summer breeding range all along the coast line, at least as far north as L'Anse au Loupe, at which place it was a summer resident. Mr. Fred. Davis informs me that the bird occasionally built its nest in a wood pile."[1]

Mr. R. MacFarlane found it breeding on the Anderson River, British North America; Mr. James Lockhart, on the Yukon, near the mouth of the Porcupine

[1] Bird Life in Labrador, 1890, p. 53.

River, Alaska; and eggs from both of these localities are now in the United States National Museum collection.

The Rusty Blackbird has also been reported by several observers as breeding commonly in Manitoba, but it is questionable if it nests there, or even in Saskatchewan—certainly not on the open plains and on the ground, as stated. All such records apply to Brewer's Blackbird, which was wrongly identified as this species.

The nest of the Rusty Blackbird is a substantial and bulky one. It is usually placed in swampy places, near water, in small spruce saplings, from 3 to 9 feet from the ground, and occasionally in other low bushes. The base is principally composed of sphagnum moss and earth, forming a firm, hard platform on which the nest proper is built. This is thickly covered on the outside with small tamarack and spruce twigs, mixed with a few blades of grass, pieces of fern, and long, green moss, especially at the base, and the inner cup is thickly and neatly lined with fine bright-green grass.

A nest now before me, taken in Herkimer County, New York, on May 14, 1891, measures 7 inches in outer diameter by 5½ inches in depth; the inner cup is 3½ inches wide by 2½ inches deep. One of these nests will last for several seasons, but a fresh one is usually built every year. These birds are very much attached to their summer homes, returning to them from year to year, and rarely more than two or three pairs nest in one locality; in fact, they are as often found singly. The eggs number four or five to a set, and one is deposited each day. Incubation lasts about two weeks, and the young are able to leave the nest in about sixteen days. They are mouse colored at first, and are carefully attended to by both parents, who are devoted to them.

The fall migration from the more northern portions of their summer range begins in the early part of September, and the species usually makes its appearance in the Upper Mississippi Valley in the last half of October.

The eggs of the Rusty Blackbird are mostly ovate in shape. The shell is strong, finely granulated, and slightly glossy. The ground color is a light bluish green, which fades somewhat with age; this is blotched and spotted more or less profusely, and generally heaviest about the larger end of the egg, with different shades of chocolate and chestnut brown and lighter shades of ecru, drab, and pearl gray. The peculiar scrawls so often met with among the eggs of our Blackbirds are rarely seen on these eggs, which are readily distinguishable from those of the other species.

The average measurement of twenty-eight specimens in the United States National Museum collection is 24.95 by 18.37 millimetres, or about 0.98 by 0.72 inch. The largest egg in the series measures 26.67 by 20.07 millimetres, or 1.05 by 0.79 inches; the smallest, 23.11 by 17.78 millimetres, or 0.91 by 0.70 inch.

Of the type specimens, No. 20266 (Pl. 7, Fig. 14), from a set of four, Bendire collection, was taken by Dr. C. Hart Merriam, near Big Moose Lake, New York, June 15, 1883, and represents a coarsely blotched specimen; No. 25598 (Pl. 7, Fig. 15), from a set of five eggs, Ralph collection, taken May 27,

1892, represents one of the ordinarily marked types; and No. 26920 (Pl. 7, Fig. 16), from a set of four, also in the Ralph collection, taken May 23, 1893, represents still another style of markings, which is not as common as the two former; the last two eggs were taken in Herkimer County, New York.

## 192. Scolecophagus cyanocephalus (Wagler).

BREWER'S BLACKBIRD.

*Psarocolius cyanocephalus* Wagler, Isis, 1829, 758.
*Scolecophagus cyanocephalus* Cabanis, Museum Heineanum, 1851, 193.
(B 418, C 222, R 274, C 332, U 510.)

Geographical range: Western North America; north to British Columbia and the Provinces of Alberta and Saskatchewan, in the Dominion of Canada; east to Manitoba, Minnesota, Nebraska, Kansas, the Indian Territory, and Texas; south to Lower California and over the Mexican table-lands to Oaxaca. Occasionally in winter to Iowa, Wisconsin, Missouri, and Illinois; casually to Louisiana and South Carolina.

Brewer's Blackbird, or the Blue-headed Grackle, is the western representative of the preceding species, and its breeding range is coextensive with its geographical distribution, excepting along its eastern border, where it is limited to northwestern Minnesota, the western parts of Nebraska, Kansas, the Indian Territory, and to nearly all of Texas, excluding only the extreme eastern portions and the immediate vicinity of the Gulf coast.

Brewer's Blackbird is common and is well known throughout the West; is found almost everywhere, in suitable localities, from the eastern slopes of the Rocky Mountains to the Pacific coast. It is equally abundant on the Great Plains, and breeds in large numbers in Manitoba and portions of Saskatchewan, where it reaches the northern limits of its range in about latitude 54° north Longitude 96° west from Greenwich marks about the eastern limits of its breeding range in the United States. Mr. Henry Nehrling reports it as breeding near Spring Creek, some 30 miles north of Houston, Texas, on May 5, 1881; and Dr. P. L. Hatch, in his "Birds of Minnesota," records it as an abundant summer resident along the Red River, in northwestern Minnesota. It is only partly migratory in the western United States, where some of these birds can be seen throughout the year. I have met with it in January, at Fort Colville, Washington; and at Fort Walla Walla a large flock, numbering fully five hundred birds, wintered regularly within the limits of the Post, feeding in the daytime on the refuse grain found about the cavalry stables, and roosting in the cottonwoods in the immediate vicinity at night. They were exceedingly tame and familiar while feeding, and although frequently shot for food and harassed daily by Prairie Falcons, Richardson's and Suckley's Merlins, and Pigeon Hawks, which subsisted almost entirely on them, they persisted in remaining, allowing a person to approach within a few feet of them while on the ground. I consider it the most confiding of all our Blackbirds. Mr. R. H. Lawrence writes that he saw a large flock at Seattle in December, 1891, and one or more

flocks in January, near Vancouver, Washington; most of these birds appeared to be males. As a rule Brewer's Blackbird likes rather open country and is not seen in extensive forest regions, and during the breeding season it shuns the swampy and tule-bordered shores of the larger inland lakes, which are the home of thousands of Yellow-headed and Red-winged Blackbirds at that time of year. Dr. E. A. Mearns, United States Army, met with it in the pine belt in Arizona, and found it common at the base of the San Francisco Mountains in June, 1887, where it was breeding.

In Colorado it has been observed up to 10,000 feet, and in the San Pedro Martir Mountains, in Lower California, Mr. A. W. Anthony found it nesting in the pines at an altitude of about 8,200 feet on May 13, 1893; while in the San Vincente Valley they nested in olive trees, and full sets of eggs were taken by him here on April 28. In western Oregon, he informs me, they often nested in old Woodpecker holes, sometimes more than 100 feet from the ground.

Brewer's Blackbird is a restless creature, and is never still for any length of time. Its manner of flight is swift, and when in flocks they generally move in a compact body; when one bird takes wing all the others follow, and a flock makes considerable noise as it passes by. On the ground, while in search of food, its walk is easy and graceful, and in walking about while feeding the birds in the rear take occasional short flights and settle down just ahead of the foremost ones; such movements are constantly taking place until startled by something, when they all take wing and settle in the nearest trees.

Their food during the summer consists mostly of caterpillars, grasshoppers, large black crickets, worms, slugs, etc., varied with small seeds, and during the winter mostly of grains of different kinds, generally refuse picked up about the stock yards and farmhouses. In the spring they may often be seen following the farmer's plow, picking up beetles, larvæ, etc., as they are uncovered, or following cattle, like Cowbirds. In the Santa Clara Valley, in California, Mr. R. H. Beck writes, a species of measuring worm attacked the apricot and prune trees in certain orchards, and had denuded many of them. When the birds discovered these worms they could be seen all day gathering them and feeding their young therewith, destroying enormous numbers; but during cherry time they helped themselves also to some cherries. Although this species may destroy some fruit at times, it certainly does far more good than harm, and deserves protection.

Their ordinary call note is a sharp "tchäck, tchäck," and in the spring of the year they are full of song, which it is utterly impossible to describe. A number of birds are usually singing, if it can be so called, at the same time, and such a concert, consisting of all sorts of sounds, must be heard to get a satisfactory idea of it. They are amiable and sociable birds, and where not molested will readily alight in the yards of houses and pick up food from the doorsteps.

Such birds as migrate usually return to their more northern breeding grounds early in April, and shortly afterwards they begin to scatter in small colonies over the surrounding country to suitable localities to breed, though

many pairs nest singly. Brewer's Blackbirds do not nest in such large bodies as do the Redwings and other species, and colonies of fifteen to twenty pairs are much less frequently found breeding together than smaller ones of from five to ten pairs; occasionally several pairs nest in the same tree. I have met with it almost everywhere in the West, from the British line to southern Arizona, but in the latter Territory only in winter. Inasmuch as it breeds in southern California, it probably breeds also in Arizona, but I did not look for its nests.

Nidification throughout the greater portion of its range usually begins about May 1; in southern California it is sometimes fully a month earlier, and the nest, in this locality at least, is generally placed in low bushes or in trees, from 2 to 30 feet from the ground, rarely higher. It nests mainly in oak, fir, cypress, juniper, pine, willow, and apple trees, and in wild-rose, service-berry, and sage-brush thickets. Ordinarily the nests are placed not over 8 feet from the ground, and in certain localities, as near Camp Harney, in southeastern Oregon, they are more frequently placed on the ground, or rather in the ground, the rim of the nest being flush with the surface. I found quite a number there in such situations, even when suitable trees and bushes were available close by, and in every such case the nest was placed close to or directly on the edge of a perpendicular bank of some small creek which might become dry by July, and never by any chance as much as a foot away from the bank. I did not find a single exception where the nest was placed on the ground, and I examined more than fifty. It puzzled me for a time to account for this, but I believe I can give the reason for it now. Cattle and Indian ponies graze close to streams in the early spring, because the grass there is generally greener and more abundant, and if the nests were not placed in the positions they are, many would undoubtedly be stepped on and the eggs or young destroyed. The birds have learned this and place them where animals will not willingly walk, that is, close to a perpendicular bank, be it ever so low.

The nest is a rather bulky structure when placed in trees or bushes, consisting of a loose platform of small sticks, mixed with weed and grass stalks, shreds of bark, rootlets, dry grass, and moss, and these materials are generally, but not always, cemented together with earth, or with cow and horse manure. Some nests are much more solidly built than others; in these well-built nests the bulk of the materials is used wet, and those built on the ground are apparently always fashioned in this way. The inner cup of the nest is neatly lined with fine rootlets, decayed shreds of bark, or horsehair, more rarely with dry grass. A nest now before me, taken near Camp Harney, Oregon, May 22, 1875, and sunk into the ground, measures 6 inches in outer diameter by 3 inches in depth; the inner cup is 4 inches wide by 2½ inches deep. Nests built in trees are bulkier and deeper on the outside, but the inner cup measures about the same. It takes about a week to complete the nest, and both sexes assist in its construction.

Throughout the greater portion of its range nidification is at its height during the last half of May, and occasionally it is protracted into July. In California it breeds ordinarily during the last two weeks of April. Capt. W. L. Carpenter, United States Army, took a set of five eggs on July 6, 1874, near

Laramie, Wyoming, which is the latest breeding record I have of this species. Usually only one brood is raised in a season, at least in the northern portions of its range. It is occasionally imposed upon by the Cowbird.

The number of eggs laid to a set varies from four to eight. Sets of five are most often found; sets of six are not unusual, though larger ones are rare. In over two hundred nests seen by me, only a single one contained seven eggs. An egg is deposited daily until the set is completed. Incubation lasts about fourteen days, and this duty is performed almost exclusively by the female. The young are large enough to leave the nest in about sixteen days, and after they are able to care for themselves they collect into small flocks and rove about the country until the fall migration begins, when they collect into large assemblies, and about the latter part of September begin to move southward. Birds wintering along our northern border appear to be nearly all adult males.

The eggs of Brewer's Blackbird are mostly ovate, less often short ovate, and rarely elliptical ovate in shape. The shell is strong, not as finely granulated as in the preceding species, and when fresh the eggs are rather glossy. Compared with those of the Rusty Grackle, they show very little resemblance, both ground color and markings being very different, and the majority are much darker. The ground color, when plainly visible, is usually pale gray white, less often pale greenish white, a color that is difficult to exactly describe. This is mostly profusely blotched, marbled, streaked, and spotted, with irregularly shaped markings of seal, walnut, liver, and clove brown, mixed with lighter shades of russet, cinnamon rufous, fawn color, and lavender. Some specimens are more or less streaked with irregular lines and tracings, resembling those found on some eggs of the Red-winged Blackbird, while in others the markings are heavy and so uniformly distributed that the ground color is entirely hidden. In a few they are fine and minute, resembling those found on the eggs of our well-known Brown Thrasher. In fact, there is an endless variety of styles of markings, and two sets are rarely found which are marked exactly alike.

The average measurement of two hundred and forty-five specimens in the United States National Museum collection is 25.49 by 18.60 millimetres, or about 1 by 0.73 inch. The largest egg in this series measures 27.94 by 20.07 millimetres, or 1.10 by 0.79 inches; the smallest, 20.83 by 15.49 millimetres, or 0.82 by 0.61 inch.

Of the type specimens, No. 20243 (Pl. 7, Fig. 17), from a set of four eggs, represents one of the heavily marked and smaller-sized specimens; No. 20246 (Pl. 7, Fig. 18), from a set of five, represents one of the lighter-marked eggs, in which the ground color is plainly visible; No. 20252 (Pl. 7, Fig. 19), also from a set of five, shows another style of markings; and No. 20264 (Pl. 7, Fig. 20), likewise from a set of five, represents still another type. These eggs are all in the Bendire collection. The first three were taken by the writer near Camp Harney, Oregon, on May 23, 1875, May 23, 1876, and May 16, 1877, respectively, and are selected out of a large number of nests examined. The last was taken by me near Fort Klamath, Oregon, on May 22, 1883, and represents one of the more common styles of markings.

## 193. Quiscalus quiscula (Linnæus).

PURPLE GRACKLE.

*Gracula quiscula* Linnæus, Systema Naturæ, ed. 10, 1758, 109.
*Quiscalus quiscula* Jordan, Manual of the Vertebrates, ed. 4, 1884, 93.
(B 421, C 225, R 278, C 335, U 511.)

Geographical range: Atlantic coast regions of the United States; from southern Connecticut and southeastern New York south to southern South Carolina; west to the eastern slopes of the Alleghany Mountains. In winter to Florida.[1]

The Purple Grackle, also called the "Purple Crow Blackbird," or simply "Crow Blackbird," is one of the best known and most familiar birds of the localities which it inhabits. In the northern parts of its range it is migratory, departing usually in the beginning of October for its winter home in our Southern States, where it congregates in immense flocks in suitable localities, while in the more southern sections it is a resident throughout the year and breeds wherever found. The birds that migrate usually return to their breeding grounds early in March, and a few even in the latter part of February, when their arrival is readily noticed. Their peculiar, squeaky notes, consisting of a variety of mostly indescribable sounds, such as "dweekh, dweekh, tchäh, tchäh, quäk, quäk," or "dæ, dæ," which seem to be uttered with considerable difficulty, and are invariably accompanied by the opening of the wings and tail, may be heard any morning in early spring from the tree tops in rather open country, in pastures, as well as in city parks.

At this time of the year small companies, consisting of from twelve to fifteen birds, are usually seen together, roving from place to place and chasing each other about, in search of mates. Unfortunately, as in the case of many other species, the Purple Grackle is not looked upon with favor by the average farmer, and they are often shot in large numbers because they help themselves to a little corn when other food is scarce. Considered from an economic point of view and judged by careful examinations made by the United States Department of Agriculture of a number of stomachs of these birds killed during every month of the year, it is shown that their food consists largely of animal matter, such as grasshoppers, caterpillars, spiders, beetles, cutworms, larvæ of different insects, remains of small mammals, frogs, newts, crawfish, small mollusks, and fish. While it must be admitted that Indian corn, oats, and wheat are also eaten to some extent, much of the vegetable matter found in their stomachs consists of the seeds of noxious weeds, such as the ragweed (*Ambrosia*), smartweed (*Polygonum*), and others. Fruit is used but sparingly, and consists usually of mulberries, blackberries, and occasionally of cherries. One of the gravest

[1] In defining the geographical ranges of our Grackles of the subgenus *Quiscalus* I have mainly followed Mr Frank M. Chapman's able paper on this subject, published in the "Bulletin of the American Museum of Natural History," New York (Vol. IV, No. 1), February, 1892, which contains the latest information on this subject. This is one of the cases where it is impossible to define the ranges more closely, as the different subspecies intergrade to a considerable extent where the breeding range of one race overlaps that of one of the others.

charges against them is the destruction of the young and eggs of smaller birds, especially those of the Robin. Granting that remains of eggshells are sometimes found in their stomachs, which seems to be the case about once in twenty-five times, it does not fully prove that all of these birds are guilty of such an obnoxious habit, and on the whole it can be safely asserted that the Purple Grackle does far more good than harm, and deserves to be protected, excepting in localities where they winter, and where, from their immense numbers, they may become a serious nuisance.

They spend much of their time on the ground, being essentially ground feeders; they walk along close to the heels of the farmer while plowing, picking up beetles, grubs, etc., as they are turned up by the plow, or search the meadows and pastures for worms, grasshoppers, and other insects suitable for food. They are at all times, eminently social birds, even during the breeding season; a number of pairs generally nest together, and frequently several nests will be found in one tree. Small colonies of Purple Grackles breed regularly in the public parks of Washington, District of Columbia. They also nest sometimes in company with other species, being apparently on good terms with their neighbors.

In the selection of nesting sites, thick, bushy coniferous trees, such as cedars, pines, and firs, seem to be preferred, but many other kinds are likewise used, notably such as are overrun with vines. Where suitable trees are not available, thick bushes, especially such as overhang water, are also made use of, where the nests are occasionally placed scarcely 4 feet from the ground. Sometimes natural cavities in trees or hollow stubs, as well as the excavations of the larger Woodpeckers, are also used, and along the seashore, where the Fishhawk is common, they often place their nests in the interstices of these bulky structures, notably so on Plum Island, New York. Speaking of this locality, the late Dr. Charles S. Allen says: "In every Fishhawk's nest, except those on the ground, I always found from two to eight or ten nests of the Purple Grackle. They were situated in crevices among the sticks, under the edges of the nest, or even beneath the nest itself, so as to secure protection from rain and bad weather. They were very bold in collecting fragments from the table of their powerful neighbor."[1]

Mr. J. H. Pleasant, jr., of Baltimore, Maryland, writes as follows: "On May 19, 1888, I discovered a colony of Purple Grackles nesting under the eaves and rafters of a hay barn. In some instances the entrance to the nest was so small that it was extremely difficult to obtain the eggs. The crevices in which the nests were built were very much of the same character as those frequently chosen by the English Sparrow, and were situated at an average height of 25 feet from the ground; over a dozen nests were observed."

Mr. Theodore W. Richards, of Washington, District of Columbia, found a colony of these birds in Northampton County, Virginia, in May, 1891, breeding in a grove of small second-growth pines, some 20 feet in height, in company with Green Herons. The Grackles' nests were invariably placed in the very top of the trees, while their less assuming companions were content to dwell in the

[1] The Auk, Vol. IX, 1892, p. 319.

lower story, so to speak, their platforms seldom being over 10 feet from the ground, and loosely balanced on the top of a horizontal branch.[1]

The nests are rather loosely constructed and bulky. The materials used vary greatly according to locality; the outer walls are usually composed of coarse grass, weed stalks, eelgrass, or seaweed, sometimes with a foundation of mud, and again without it. The inner cup of the nest is composed of similar but finer materials, and is generally lined with dry grass, among which occasionally a few feathers, bits of paper, strings, and rags may be scattered; in fact anything suitable and readily obtained is liable to be utilized. Exteriorly the nests vary from 5 to 8 inches in height, and from 7 to 9 inches in diameter, according to location. They are ordinarily about 3 inches deep by 4 inches wide inside. The nests are placed at various distances from the ground, some as low as 3 feet, and others in the extreme tops of trees, or on horizontal limbs from 20 to 30 feet up, or occasionally even higher. At Washington, District of Columbia, the Purple Grackle begins to build, or to repair the old site, about the beginning of April, and in favorable seasons full sets of eggs may be looked for about the middle of this month, usually, however, not before the first week in May, about which time they begin laying generally throughout their range. Incubation, in which both parents assist, lasts about two weeks, and they are equally solicitous in the defense of their eggs or young; the latter are able to leave the nest in about eighteen days, and sometimes a second brood is raised. They are fed almost entirely on insects while in the nest.

The number of eggs to a set varies from four to six, very rarely seven, and sets of five are most often found. The shell is strong, fine grained, and slightly glossy.

The ground color of the Purple Grackle's egg varies from a pale greenish white to a light rusty brown; they are generally blotched or streaked with irregular lines and dashes of various shades of dark brown, and in an occasional set different tints of lavender markings are also noticeable. Only in rare instances are these markings so profuse and evenly distributed over the entire egg as to hide the ground color. They vary greatly in style and character in different sets.

The average measurement of eighty-five specimens is 28.53 by 20.89 millimetres, or about 1.12 by 0.82 inches. The largest egg of the series measures 32.76 by 23.11 millimetres, or 1.29 by 0.91 inches; the smallest, 25.65 by 20.57 millimetres, or 1.01 by 0.81 inches. I am aware that this does not agree with the average measurements generally given for these eggs, but it is nevertheless correct.

The type specimens, No. 23394 (Pl. 7, Fig. 21), from a set of six eggs taken by Mr. Charles W. Richmond on April 17, 1887; No. 24775 (Pl. 7, Fig. 22), from a set of five eggs, and No. 24776 (Pl. 7, Fig. 23), from a set of four eggs, both taken by Mr. Guy E. Mitchell on May 9, 1887, were all obtained near Washington, District of Columbia. These eggs, as well as those figured for the two subspecies, *Quiscalus quiscula aglæus* and *Quiscalus quiscula æneus*, represent some of the different styles of coloration found among the three recognized races of this Grackle.

[1] Oölogist, Vol. VIII, June, 1891, p. 1828.

## 194. Quiscalus quiscula aglæus (Baird).

FLORIDA GRACKLE.

*Quiscalus aglæus* Baird, American Journal of Science and Arts, 1866, 84.
*Quiscalus quiscula aglæus* Stejneger, Auk, II, Jan., 1885, 43, footnote.
(B 422, C —, R 278*a*, C 336, U 511*a*.)

Geographical range: From southern South Carolina (Charleston) south through the Florida peninsula; west through southern Georgia and the Gulf coast of Florida to southeastern Louisiana (New Orleans).

The Florida Grackle, or Florida Crow Blackbird, a slightly smaller race than the preceding, is generally resident and breeds wherever found. Its general habits are similar to those of the Purple Grackle in nearly every respect. It breeds both in swamps and on higher grounds, in pine woods and orange groves, etc.; the nesting season begins sometimes in the latter part of March, but usually about the first week in April, and occasionally as late as May.

Dr. William L. Ralph finds this subspecies common in Putnam County, Florida, and the United States National Museum is indebted to him for nearly all the eggs of this race in the collection, as well as for the nests and skins. The nests vary somewhat in composition; some are made of coarse grass, leaves, etc., taken from the ground in swamps, pressed firmly together, and thickly covered on the outside with Spanish moss, with which a few pieces of grass, twigs, etc., are mixed, and they are lined with finer dry grass. In other nests the outer walls are mainly composed of coarse grass, weeds, and but little Spanish moss; these materials are cemented together with cow manure and mud, and the nests are lined with wire grass (*Aristida*); again flags, wet sphagnum moss, pine needles, and small twigs are used to a considerable extent in these structures. Such substances as are most readily obtained near the nesting site are generally utilized, and this accounts for the variable nature of the materials used.

A nest now before me, built in an orange tree, about 8 feet from the ground, measures 5½ inches in height and 8 inches in outer diameter. The inner cup of the nest is 3¾ inches deep by 4¼ inches in diameter. Most of the nests found by Dr. Ralph were placed in low bushes, from 2 to 7 feet above the water in cypress swamps; others were found in orange trees and small pines, at no great distance from the ground. One nest, containing four eggs, in which incubation was about one-fourth advanced, taken by him March 30, had been placed directly under an occupied nest of the Green Heron, with an interval of about 6 inches between them. It was in a bush in a cypress swamp, about 5 feet from the ground.

The number of eggs to a set varies from three to five, and these show about the same variations in color and markings as those of the Purple Grackle, and can not be distinguished from them, excepting that they are somewhat larger.

The average measurement of twenty-three eggs, all from Florida, is 30.48 by 20.97 millimetres, or 1.20 by 0.82 inches. The largest egg measures 36.32 by

21.34 millimetres, or 1.43 by 0.84 inches; the smallest, 26.92 by 19.30 millimetres, or 1.06 by 0.76 inches. As will be seen, these eggs measure considerably more on an average than do those of its larger relative, the Purple Grackle.

The type specimens, Nos. 25824 and 25825 (Pl. 7, Figs. 24 and 25), Ralph collection, from sets of five and four eggs, respectively, were both taken near San Mateo, Florida, on April 25, 1885, and April 14, 1888, by Dr. William L. Ralph, and represent the better-colored phases found among the eggs of this subspecies.

## 195. Quiscalus quiscula æneus (Ridgway)

BRONZED GRACKLE.

*Quiscalus æneus* Ridgway, Proceedings Academy Natural Sciences, Philadelphia, June, 1869, 134.

*Quiscalus quiscula æneus* Stejneger, Auk, II, Jan., 1885, 43, footnote.

(B —, C 225*a*, R 278*b*, C 337, U 511*b*.)

Geographical range: From northern British North America, vicinity of Great Slave Lake and the country bordering the southern half of Hudson Bay; southern Labrador and southern Newfoundland, southward through the Dominion of Canada and the United States; west to the eastern slopes of the Rocky Mountains; south to the Rio Grande Valley, in Texas, and the Gulf coast, to the mouth of the Mississippi, and thence northeasterly through Mississippi, Alabama, northern Georgia, along the western slopes of the Alleghanies, reaching the Atlantic seacoast again in Massachusetts and following it to Nova Scotia. In winter, passing, to some extent, into Mexico, and casually to the eastern slopes of the Alleghany Mountains.

The Bronzed Grackle, also known as the "Western Crow Blackbird," is far more numerous than either of the two preceding species, and breeds throughout its extensive range. Although only considered as a race in the "American Ornithologists' Union Check List," in my opinion it is a perfectly good species and entitled to specific rank.

Within the United States it is especially abundant; throughout the valleys of the Mississippi River and its larger tributaries, and particularly so along our northern border and in southern British North America, east of the Rocky Mountains, where it breeds in large colonies in favorable localities. While not so common in our prairie States, it is generally distributed throughout the region and is recorded from all of them.

In the northern portions of its range it is only a summer visitor, usually migrating southward in immense numbers in the early fall, passing through our Northern States during the latter part of October, and remaining there in favorable seasons sometimes well into November, and returning from its winter haunts in our Southern States and eastern Mexico during February and March. The majority of these birds winter south of latitude 37° N.

Mr. W. E. Loucks, of Peoria, Illinois, says: "Thousands of these birds are to be found here in the spring, and while many of them pass north, others remain to breed. At this time of the year they make the bottom lands their

rendezvous. On their first arrival they keep in flocks for a few weeks, roosting in the willows, and, together with the Red-winged Blackbirds, make a deafening noise, forming a general roost in which all the flocks from the surrounding country join, and so great are their numbers that the trees appear black. In the fall they again gather in large flocks, but betake themselves to the highlands, where they remain until their departure for the south. Oak woods and orchards are now their resorts, whence an occasional visit is made to the fields for food. In the vicinity of Peoria they nest in uplands, where an orchard or a clump of pines or occasionally a soft maple is selected for this purpose; but if one wants to see them in greater abundance he should take a boat and row into the willow swamps, where they nest in large numbers, the nests generally being placed in willow trees, at various distances from the water level, say from 4 to 25 feet, and occasionally higher."

The general habits of the Bronzed Grackle do not vary greatly from those of the preceding species, and their food is very similar. During the breeding season this consists almost entirely of insects of various kinds, while later in the summer corn is eaten to a considerable extent. In the north, where wild rice is abundant, this, as well as other small seeds, forms a considerable portion of their daily fare. Beechnuts are also eaten by them, and they have been observed catching bees.

There are two sides to every question, and while there is no doubt that the Bronzed Grackle does some harm to the matured corn crops in certain sections in the fall, due mainly to the enormous numbers of these birds that congregate in some localities during their migration, it is equally true that at all other times, especially during the breeding season, they do considerable good, subsisting and feeding their young almost entirely on noxious insects of all kinds, especially cutworms, which destroy a great deal of young corn, but whose depredations are often erroneously charged to the birds while searching for them.

The nesting season is somewhat variable, and ranges from the first week in March to the latter half of June, according to locality, although even at Fort Resolution, near Great Slave Lake, at the extreme northern point of its known range, eggs were taken by Mr. J. Lockhart, of the Hudson Bay Company, as early as May 17, 1863; while at Fort Custer, Montana, they had not even commenced breeding at that time. I took my first fresh eggs there on May 29, and others as late as June 14, 1885.

The late Dr. William C. Avery, of Greensboro, Alabama, found birds intermediate between this and the Florida Grackles nesting there on April 25, 1890. Dr. James C. Merrill, United States Army, took fresh sets at Fort Reno, Indian Territory, as late as May 31, 1890, and Dr. Ralph found them laying at Holland Patent, Oneida County, New York, in the latter part of April or the beginning of May. Climate seems to have little influence on the time of nesting.

Where coniferous trees are obtainable preference seems to be given to them as nesting sites; willows, oaks, maples, elms, sycamores, and cottonwoods are

also frequently used, especially trees covered by grapevines. In the West natural cavities and hollow stubs, as well as the excavations of the larger Woodpeckers, are often resorted to. I found several nests placed in open spaces in stacks of cord wood near Fort Custer, Montana.

Both Mr. M. Chamberlin and Mr. J. W. Banks inform me that in New Brunswick these Grackles nest frequently in hay barns. The hay is taken away from the marshy islands bordering the rivers on the ice in winter, and these birds take possession of such barns in large numbers in the spring, placing their nests in the angle of a brace or on the beams and girders, much in the same fashion as that adopted by the Robins.

Mr. J. W. Preston, of Baxter, Iowa, in referring to their nesting habits in the lake regions of northern Iowa and Minnesota, says: "A vast colony occupied a brushy flat near Cairo Lake, Hamilton County, Iowa, during the season of 1881. When I saw them the young birds were leaving the nests, and the noise and din of the scolding, squalling parents and crying young were deafening as one walked among the nests, which were crowded in the tops of wild-plum trees. I also saw a large colony in a tract of bushy land at the northern extremity of Heron Lake, Minnesota. Here the nests were placed in low shrubs and wild-gooseberry bushes, some not more than 1 foot from the ground. The construction differed somewhat from the ordinary nest. The structures were deep and heavy, and were made of dry grass, with a filling or wall of mud between the outer wall and the lining. I have seen an odd nest of this Grackle built in a bunch of common reed (*Phragmites*), which looks like broom corn at a distance and grows from 5 to 12 feet high. This nest resembled that of a Yellow-headed Blackbird, the material being evenly woven together."

There is not much difference in their nests; compared with those of the Purple and Florida Grackles, they vary like these in composition according to locality, and their nesting habits and eggs are also similar. The number of eggs to a set varies from four to six or rarely seven; sets of five are most often found, and six are not unusual.

The average measurement of a series of one hundred and forty-eight specimens in the United States National Museum collection is 29.02 by 20.90 millimetres, or about 1.14 by 0.82 inches. The largest egg measures 31.50 by 21.59 millimetres, or 1.24 by 0.85 inches; the smallest egg, 25.40 by 19.05 millimetres, or 1 by 0.75 inches.

The type specimen, No. 23206 (Pl. 7, Fig. 26), from a set of five eggs, taken by Mr. V. N. Edwards, near Woods Hole, Massachusetts, on May 27, 1887, represents one of the darkest eggs in the entire series; while No. 25889 (Pl. 7, Fig. 27), from a set of four eggs, Ralph collection, taken by Dr. William L. Ralph, on May 18, 1887, near Holland Patent, New York, shows one of the rarer types of coloration.

## 196. Quiscalus macrourus Swainson.

GREAT-TAILED GRACKLE.

*Quiscalus macrourus* Swainson, Animals in Menageries, 1838, 299.
(B 419, C 223, R 275, C 333, U 512.)

Geographical range: From Nicaragua, Central America, north through eastern Mexico to southern Texas.

The range of the Great-tailed Grackle within the United States is restricted to the southern portions of Texas, contiguous to the Gulf coast and the lower Rio Grande Valley. In the interior of the State it has been met with in Bexar and Harris counties, which probably mark about the northern limits of its range. Mr. H. P. Attwater considers it to be a common summer resident near San Antonio, Texas, and a few winter there. Mr. Nehrling found it nesting in scattered pairs in and about Houston, Texas, which marks about the eastern limit of its distribution in this State. It is generally a resident and breeds wherever found, and in the lower Rio Grande Valley it is very abundant.

Mr. George B. Sennett, speaking of the Great-tailed Grackle, says: "When I think of this bird it is always with a smile. It is everywhere as abundant on the Rio Grande as is *Passer domesticus*, the English Sparrow, in our Northern cities, and equally tame when about habitations. This bird is as much a part of the life of Brownsville as the *barrelero* rolling along his cask of water or the mounted beggar going his daily rounds. In the towns and about the ranches he knows no fear; is always noisy, never at rest, and in all places and positions, now making friends with the horses in the barns, or the cattle in the fields, then in some tree pouring forth his notes, which I can liken only to the scrapings of a cornstalk fiddle; now stealing from porch or open window some ribbon for his nest, then following close behind the planter, quick to see the dropping corn. With all his boldness and curiosity the boys of the streets say they can not trap or catch him in a snare. He will take every bait or grain but the right one; he will put his feet among all sorts of rags but the right ones, and the boys are completely outwitted by a bird. He performs all sorts of antics; the most curious and laughable performance is a common one with him: Two males will take position facing each other on the ground or upon some shed; then together they begin slowly raising their heads and twisting them most comically from side to side, all the time eyeing each other, until their bills not only stand perpendicular to their bodies, but sometimes are thrown over nearly to their backs. After maintaining this awkward position for a time they will gradually bring back their bills to their natural position, and the performance ends. It is a most amusing thing to witness, and seems to be mere fun for the birds, for nothing serious grows out of it."[1]

Their food consists of different kinds of insects and their larvæ, small crustaceans, dead fish, seeds and grain of various kinds, and on the whole they do comparatively little injury.

[1] Notes on the Ornithology of the Lower Rio Grande in Texas, U. S. Geological and Geographical Survey, Vol. IV, 1878, pp. 27 and 28.

The Great-tailed Grackles are more or less gregarious at all times, and generally breed in companies, often in considerable colonies, among the willow thickets and chaparrals bordering the streams and irrigating ditches, or in the tops of mesquite, ebony and colima trees, so common a feature in the lower Rio Grande Valley; they nest less often in hackberry, prickly ash, and oak trees, as well as in the extensive canebrakes bordering the numerous lagoons and fresh-water lakes and in the rushes in the salt marshes near the Gulf coast. Dr. Merrill, United States Army, found them very common on the military reservation in the vicinity of Brownsville, Texas, nesting in the tops of different kinds of trees, as well as in the tule reeds, in company with several species of Herons, and even among the interstices of the nests of Audubon's Caracara and on the same trees occupied by these birds.

Mr. E. Kirby Smith writes: "At Suchil, Vera Cruz, Mexico, the Great-tailed Grackle frequently nests under the eaves of houses, and I have seen as many as fifteen of their nests in one tree. Excepting during the breeding season the males and females keep in separate flocks. They fly very slowly. The local name for these birds is 'Petcho.'"

Mr. Charles W. Richmond informs me that this species is very common at Bluefields, on the east coast of Nicaragua, and at San Carlos on the lake, and that it is tame and familiar. It haunts particularly the wharves and low shores, where it finds a variety of food. It is quite bold, going out to the Carib craft anchored close by and visiting the decks for food. It is known as "Sanate" among the natives.

According to Mr. Sennett, when breeding in swamps their nests are frequently placed within 2 feet of the water, and from 4 to 30 feet from the ground when in trees. Their nests, of which I have several before me, resemble those of the rest of our eastern Grackles in size, construction, and materials; some of them are almost entirely composed of Spanish moss, while others are mainly built of small, round stems of creeping plants which are flexible enough to admit of their being securely woven together. Mud is often used to bind the materials together, and the upper rim of the nest is generally securely fastened to the surrounding branches or reed stalks among which it is placed. Some nests show no traces of mud in their composition, but the materials forming the outer walls appear to have been quite wet when gathered. The lining usually consists of dry grass and fine roots, and when near towns bits of cotton cloth, feathers, paper, etc., are often found mixed among the other materials.

Nidification usually begins during the latter part of April; it is at its height in the first half of May and lasts through June. One and sometimes two broods are reared in a season. Young birds of various sizes and fresh eggs may frequently be found in the same colony. The earliest record I have of eggs being taken is one by Dr. Merrill, United States Army, at Brownsville, Texas, on April 4. Both sexes assist in incubation, which lasts about fifteen days, and in the care of the young, for which they show a great deal of solicitude.

The number of eggs laid to a set is usually three or four. Sets of five are occasionally found, but clutches of this size are rather rare.

The ground color is usually pale greenish blue, and is often more or less clouded over with purple vinaceous and smoky pale umber tints, which are usually heaviest and most pronounced about the smaller end of the egg. The markings consist mainly of coarse, irregularly shaped lines and tracings of different shades of dark brown, black, and smoky gray, and less-defined tints of plumbeous. In rare instances an egg is found which is only faintly marked with a few indistinct lines of lavender gray about the small end, the rest of the shell being immaculate. They are mostly elongate ovate in shape; a few are blunt ovate, while others approach a cylindrical ovate.

The average measurement of ninety-three specimens in the United States National Museum collection is 32.18 by 21.75 millimetres, or about 1.27 by 0.86 inches. The largest egg in the series measures 36.58 by 22.61 millimetres, or 1.44 by 0.89 inches; the smallest, 28.19 by 20.57 millimetres, or 1.11 by 0.81 inches.

The type specimen, No. 20290 (Pl. 7, Fig. 28), from a set of three eggs, was taken by Dr. James C. Merrill, United States Army, near Fort Brown, Texas, on May 17, 1877, and represents a small-sized and dark-colored egg of this species. No. 25626 (Pl. 7, Fig. 29), also from a set of three, Ralph collection, was taken near Brownsville, Texas, on May 21, 1891, and shows a well-marked and average-sized egg.

## 197. Quiscalus major Vieillot.

BOAT-TAILED GRACKLE.

*Quiscalus major* Vieillot, Nouveau Dictionnaire d'Histoire Naturelle, XXVIII, 1819, 487. (B 420, C 224, R 277, C 334, U 513.)

Geographical range: South Atlantic and Gulf coasts of the United States, from Maryland southward; west to southeastern Texas. Casual in southern New Jersey.

The Boat-tailed Grackle, also locally known as the "Thrush Blackbird," "Boat-tailed Blackbird," and "Jackdaw," is an abundant resident in the southern portions of its range, along the coast and on the islands of South Carolina, Georgia, Florida, Mississippi, and Louisiana. In the northern parts of its range, which extends well into Maryland (Kent County), on the shores of Chesapeake Bay, it is only a summer visitor, but some of these birds winter in suitable localities in Virginia and North Carolina. It has also been observed in the vicinity of Cape May, New Jersey, in the summer, and possibly it breeds there in small numbers. It is known to breed at Pomona, Maryland, the most northern record I am aware of. It is not uncommon on several islands off the coast of Virginia, and a large colony was observed nesting on one of the small islands in Chesapeake Bay by Mr. Theodore W. Richards. Mr. H. Nehrling found it breeding in the vicinity of Houston, Texas, which marks about the western limit of its range; here it overlaps the eastern range of the preceding species.

Like the rest of the Grackles, they are gregarious and sociable in their habits, breeding together in colonies in suitable localities, and roving about

during the rest of the year in large flocks. In some sections they disappear sometimes from their usual haunts in the late summer for a month or so, for some unknown reason, probably going in search of better feeding grounds, only to return later. They spend a good deal of their time on the ground, walking along slowly and sedately while searching for food. It requires quite an effort for one of the birds to rise from the ground, and until fairly started its flight is slow, heavy, and laborious.

Their food is largely derived from the sea, and consists mainly of small mollusks and crustaceans of different kinds picked up in the salt marshes and mud flats during low tide, and of dead fish, insects, etc., carried in by the tides. They also feed, though to a small extent only, on vegetable matter, such as rice and other grains, and occasionally on fruit.

In the more northern portions of their range these birds usually arrive about the beginning of March, and are at first very restless, roving about from place to place until the nesting season commences. They are unusually noisy during this time, and their peculiar, grating notes can be constantly heard; some of these are very shrill and unpleasant to the ear, but frequently during the mating season a rather indifferent attempt at singing is made; this is somewhat less disagreeable, but impossible to describe on paper.

Mr. Frank M. Chapman describes a singular note of theirs as resembling the flapping of wings, as of a Coot tripping over the water. He says: "This sound was very familiar to me, and so excellent is the imitation that for a long time I attributed it to one of the numerous Coots which abound in most places favored by *Quiscalus major*."[1]

Mr. W. E. Grover, of Galveston, Texas, writes: "One of their common call notes, when sitting at ease in a tree, is a noisy, clucking 'clac-clac-clac,' frequently followed by a long-drawn whistle like 'who-it, who-it.' In this vicinity they nest principally in tule reeds growing in fresh-water ponds, and in the thick matted grass on the edges of salt bayous, some nests being partly in the water at high tide. Some also nest in Cherokee rosebushes, and occasionally a pair will build in a tree, as much as 40 feet from the ground. The nests of birds building in trees are not so deep nor so well made as those in the canes."

Nidification appears to be somewhat irregular with this species. In southern Florida some of these birds begin laying during the first week in March, when quite a number have not even begun nest building. The nesting season lasts until June here, and probably two broods are raised regularly. In the northern portions of their range it begins in the latter part of April, and is sometimes protracted until May. The nests are usually strong, bulky structures, measuring, on an average, about 7 inches in height by 8 inches in width. The inner cup is about 3 inches deep by 4½ inches in diameter. They are constructed mainly of coarse grass, sedges, weed stalks, and fibrous roots, cemented and more or less mixed with mud. In some nests no mud is used, and these are consequently not as solid. Some are built principally of Spanish moss, others of eel-

[1] The Auk, 1888, p. 273.

grass, the materials used varying in different localities. Cotton, rags, feathers, and seaweeds are also sometimes incorporated into the walls. They are placed on various kinds of trees and bushes, such as oaks, pines, and willows, and at various heights from the ground, ranging from 3 to 40 feet up, and again in water-myrtle bushes, canebrakes, and reeds in swamps, not over 18 inches above the water level.

The number of eggs laid to a set varies from two to five. Sets of three are most common; but in certain localities sets of four are equally so, while those of five are somewhat rare.

Incubation lasts about fifteen days, and this duty seems to be mostly performed by the female. The male, however, assists in feeding the young, and after they are able to care for themselves the sexes separate in flocks and remain apart until the mating season approaches again.

The eggs of the Boat-tailed Grackle closely resemble those of the preceding species, both in shape and coloration, excepting that the cloudy purple vinaceous and pale umber tints are generally more evenly distributed over the entire shell, when present, and are not so noticeable at the small end of the egg. In some instances the lines and tracings with which they are marked are also perceptibly finer as well as more profuse, being more like the markings found in the eggs of the Baltimore and Bullock's Oriole. They also average somewhat less in size.

The average measurement of ninety-eight eggs in the United States National Museum collection is 31.60 by 22.49 millimetres, or about 1.24 by 0.89 inches. The largest egg measures 34.29 by 24.64 millimetres, or 1.35 by 0.97 inches; the smallest, 27.94 by 21.59 millimetres, or 1.10 by 0.85 inches.

The type specimens, Nos. 25632 and 25634 (Pl. 7, Figs. 30 and 31), both from sets of three eggs, from the Ralph collection, were taken in McIntosh County, Georgia, on April 26 and 29, 1890, and represent the ordinary styles of markings.

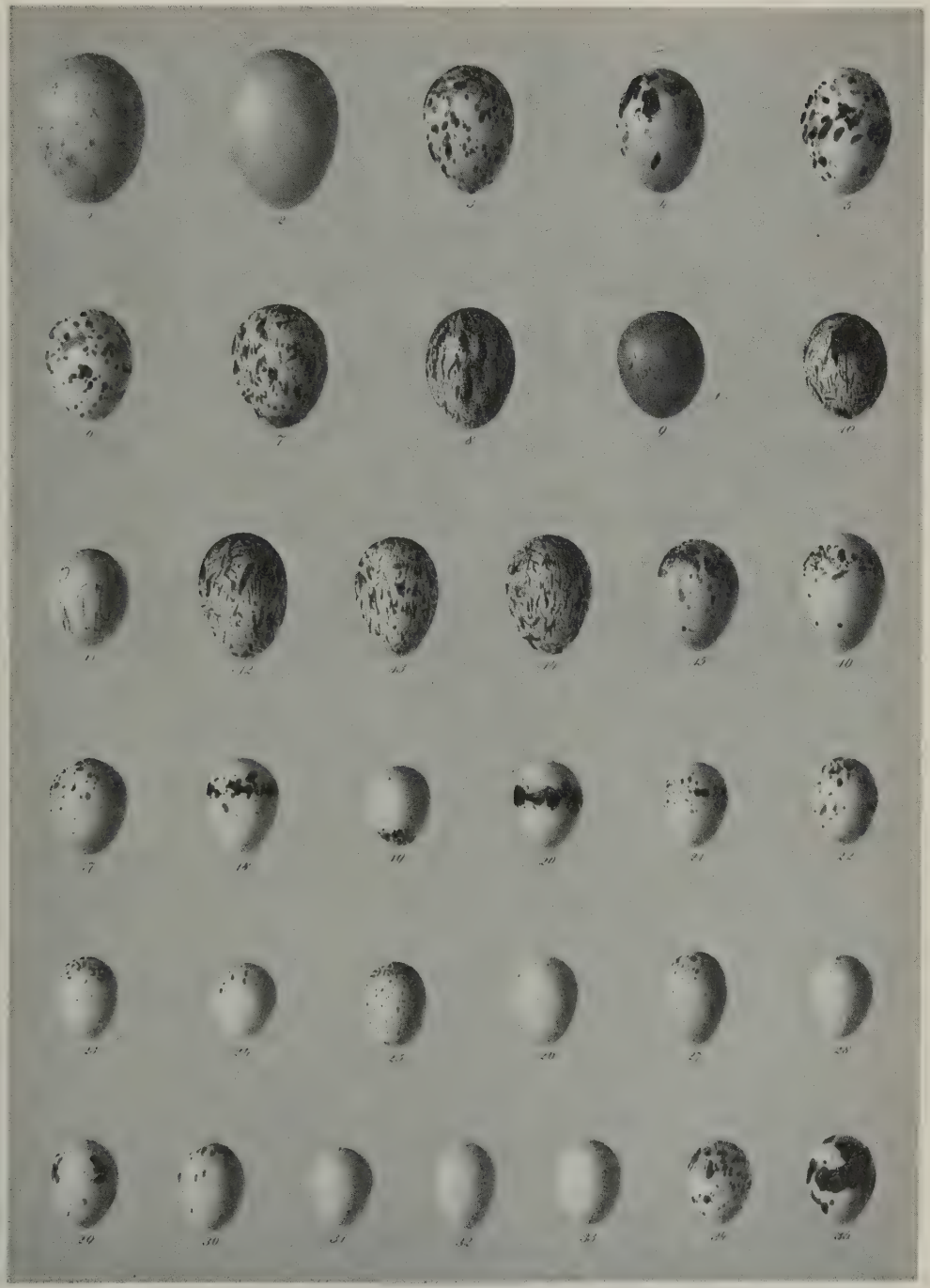
## EXPLANATION TO PLATE I.

Fig. 1. Conurus carolinensis, Linnæus. Carolina Paroquet.
Fig. 2. Geococcyx californianus, Lesson. Road-runner.
Fig. 3. Ceryle alcyon, Linnæus. Belted Kingfisher.
Fig. 4. Ceryle americana septentrionalis, Sharpe. Texan Kingfisher.
Fig. 5. Ceophlœus pileatus, Linnæus. Pileated Woodpecker.
Fig. 6. Crotophaga ani, Linnæus. Ani.
Fig. 7. Crotophaga sulcirostris, Swainson. Grooved-billed Ani.
Figs. 8, 9. Antrostomus carolinensis, Gmelin. Chuck-will's Widow.
Figs. 10, 11. Antrostomus vociferus, Wilson. Whip-poor-will.
Figs. 12, 13. Milvulus forficatus, Gmelin. Scissor-tailed Flycatcher.
Figs. 14, 15. Tyrannus tyrannus, Linnæus. Kingbird.
Figs. 16, 17. Tyrannus verticalis, Say. Arkansas Kingbird.
Figs. 18, 19. Tyrannus vociferans, Swainson. Cassin's Kingbird.
Figs. 20, 21. Pitangus derbianus, Kaup. Derby Flycatcher.
Fig. 22. Myiozetetes texensis, Giraud. Giraud's Flycatcher.
Fig. 23. Phalænoptilus nuttalli, Audubon. Poor-will.
Fig. 24. Dryobates pubescens, Linnæus. Downy Woodpecker.
Fig. 25. Chætura pelagica, Linnæus. Chimney Swift.
Fig. 26. Chætura vauxii, Townsend. Vaux's Swift.
Fig. 27. Trochilus colubris, Linnæus. Ruby-throated Hummingbird.
Fig. 28. Sayornis phœbe, Latham. Phœbe.
Fig. 29. Sayornis saya, Bonaparte. Say's Phœbe.
Fig. 30. Sayornis nigricans, Swainson. Black Phœbe.

Lith. by Ketterlinus, Phila.

## EXPLANATION TO PLATE II.

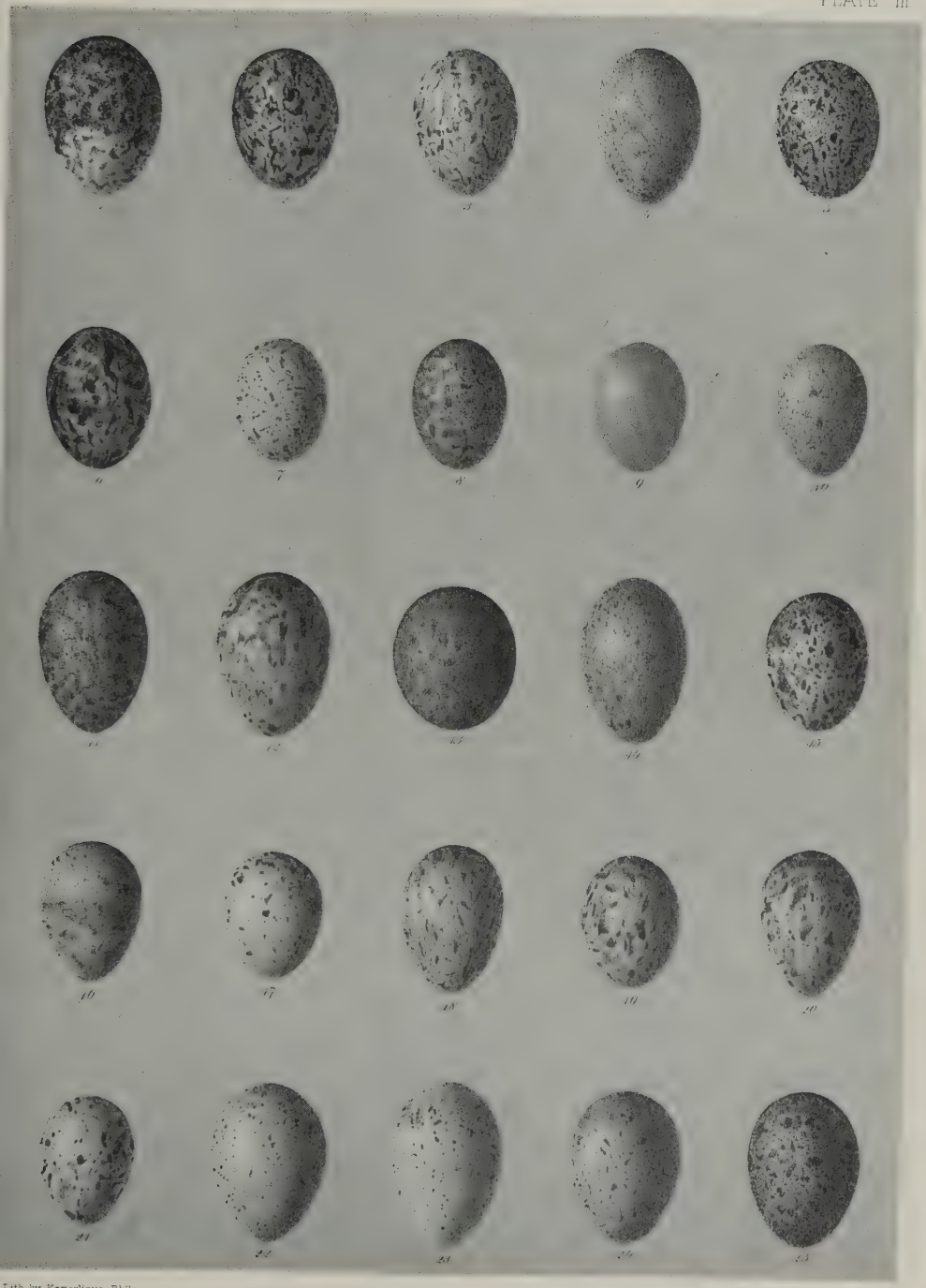
Figs. 1, 2. Nyctidromus albicollis merrilli, Sennett. Merrill's Parauque.
Figs. 3, 4. Tyrannus dominicensis, Gmelin. Gray Kingbird.
Figs. 5, 6. Tyrannus melancholicus couchii, Baird. Couch's Kingbird.
Fig. 7. Myiodynastes luteiventris, Sclater. Sulphur-bellied Flycatcher.
Figs. 8, 9. Myiarchus crinitus, Linnæus. Crested Flycatcher.
Figs. 10, 11. Myiarchus mexicanus, Kaup. Mexican Crested Flycatcher.
Fig. 12. Myiarchus mexicanus magister, Ridgway. Arizona Crested Flycatcher.
Fig. 13. Myiarchus cinerascens, Lawrence. Ash-throated Flycatcher.
Fig. 14. Myiarchus cinerascens nuttingi, Ridgway. Nutting's Flycatcher.
Figs. 15, 16. Contopus borealis, Swainson. Olive-sided Flycatcher.
Fig. 17. Contopus pertinax, Cabanis. Coues's Flycatcher.
Figs. 18, 19. Contopus virens, Linnæus. Wood Pewee.
Figs. 20, 21, 22. Contopus richardsonii, Swainson. Western Wood Pewee.
Fig. 23. Empidonax flaviventris, Baird. Yellow-bellied Flycatcher.
Figs. 24, 25. Empidonax difficilis, Baird. Western Flycatcher.
Figs. 26, 27. Empidonax acadicus, Gmelin. Acadian Flycatcher.
Figs. 28, 29. Empidonax pusillus, Swainson. Little Flycatcher.
Fig. 30. Empidonax pusillus traillii, Audubon. Traill's Flycatcher.
Fig. 31. Empidonax minimus, Baird. Least Flycatcher.
Fig. 32. Empidonax hammondi, Xantus. Hammond's Flycatcher.
Fig. 33. Empidonax wrightii, Baird. Wright's Flycatcher.
Figs. 34, 35. Pyrocephalus rubineus mexicanus, Sclater. Vermilion Flycatcher.



Lith by Ketterlinus, Phila.

## EXPLANATION TO PLATE III.

Figs. 1, 2, 3. Chordeiles virginianus, Gmelin. Nighthawk.
Fig. 4. Chordeiles virginianus henryi, Cassin. Western Nighthawk.
Figs. 5, 6. Chordeiles virginianus chapmani, Sennett. Florida Nighthawk
Figs. 7, 8, 9, 10. Chordeiles acutipennis texensis, Lawrence. Texan Nighthawk.
Figs. 11, 12, 13. Pica pica hudsonica, Sabine. American Magpie.
Fig. 14. Pica nuttalli, Audubon. Yellow-billed Magpie.
Figs. 15, 16, 17. Xanthoura luxuosa, Lesson. Green Jay.
Figs. 18, 19. Perisoreus canadensis, Linnæus. Canada Jay.
Fig. 20. Perisoreus canadensis nigricapillus, Ridgway. Labrador Jay.
Fig. 21. Perisoreus obscurus, Ridgway. Oregon Jay.
Figs. 22, 23. Nucifraga columbiana, Wilson. Clarke's Nutcracker.
Figs. 24, 25. Cyanocephalus cyanocephalus, Wied. Piñon Jay.

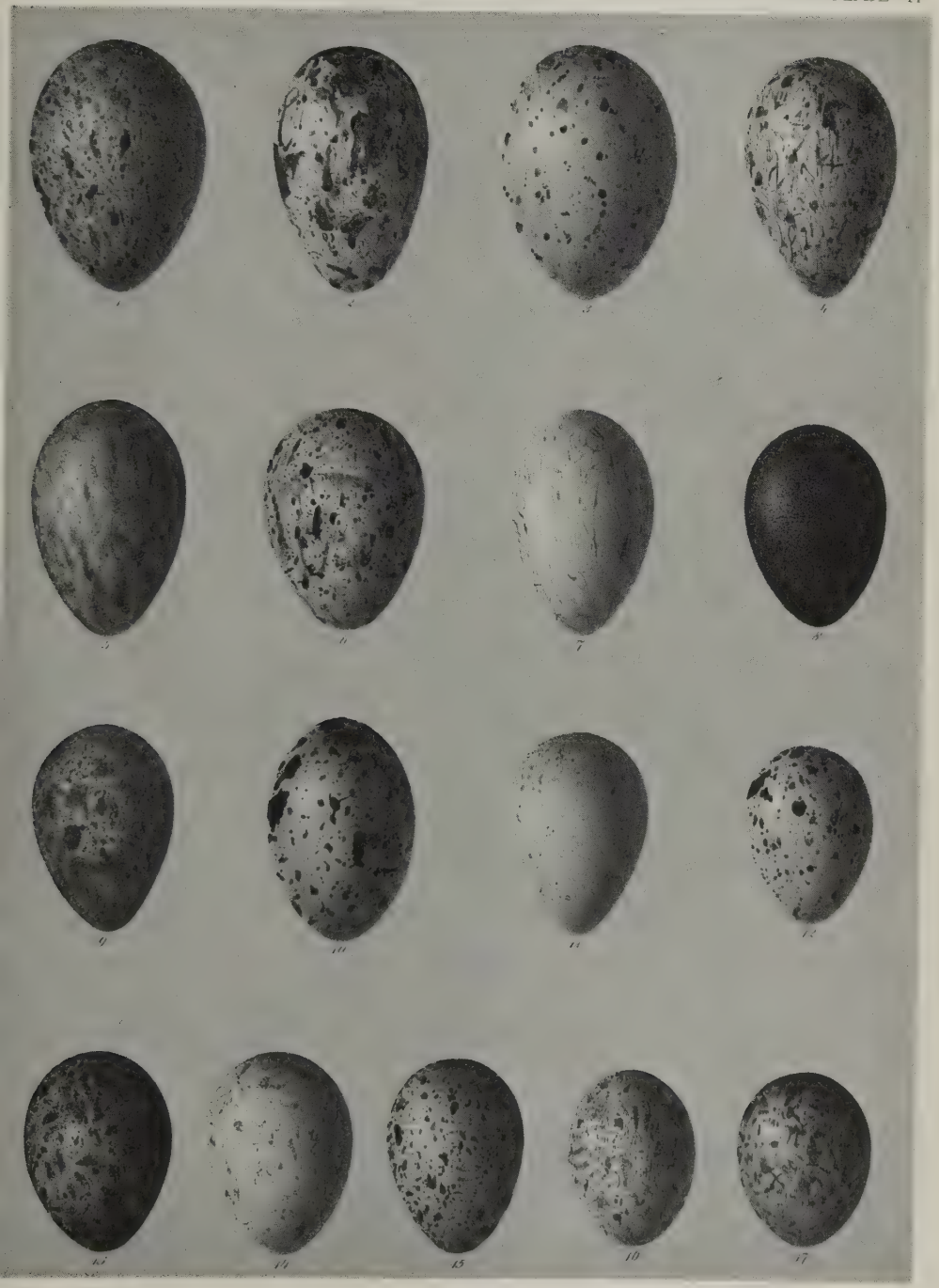


Lith by Kemerlinus Phila

## EXPLANATION TO PLATE IV.

Figs. 1, 2. Corvus corax sinuatus, Wagler. American Raven.
Fig. 3. Corvus corax principalis, Ridgway. Northern Raven.
Figs. 4, 5, 6, 7. Corvus cryptoleucus, Couch. White-necked Raven.
Figs. 8, 9, 10, 11, 12. Corvus americanus, Audubon. American Crow.[1]
Figs. 13, 14. Corvus americanus floridanus, Baird. Florida Crow.
Fig. 15. Corvus caurinus, Baird. Northwest Crow.
Figs. 16, 17. Corvus ossifragus, Wilson. Fish Crow.

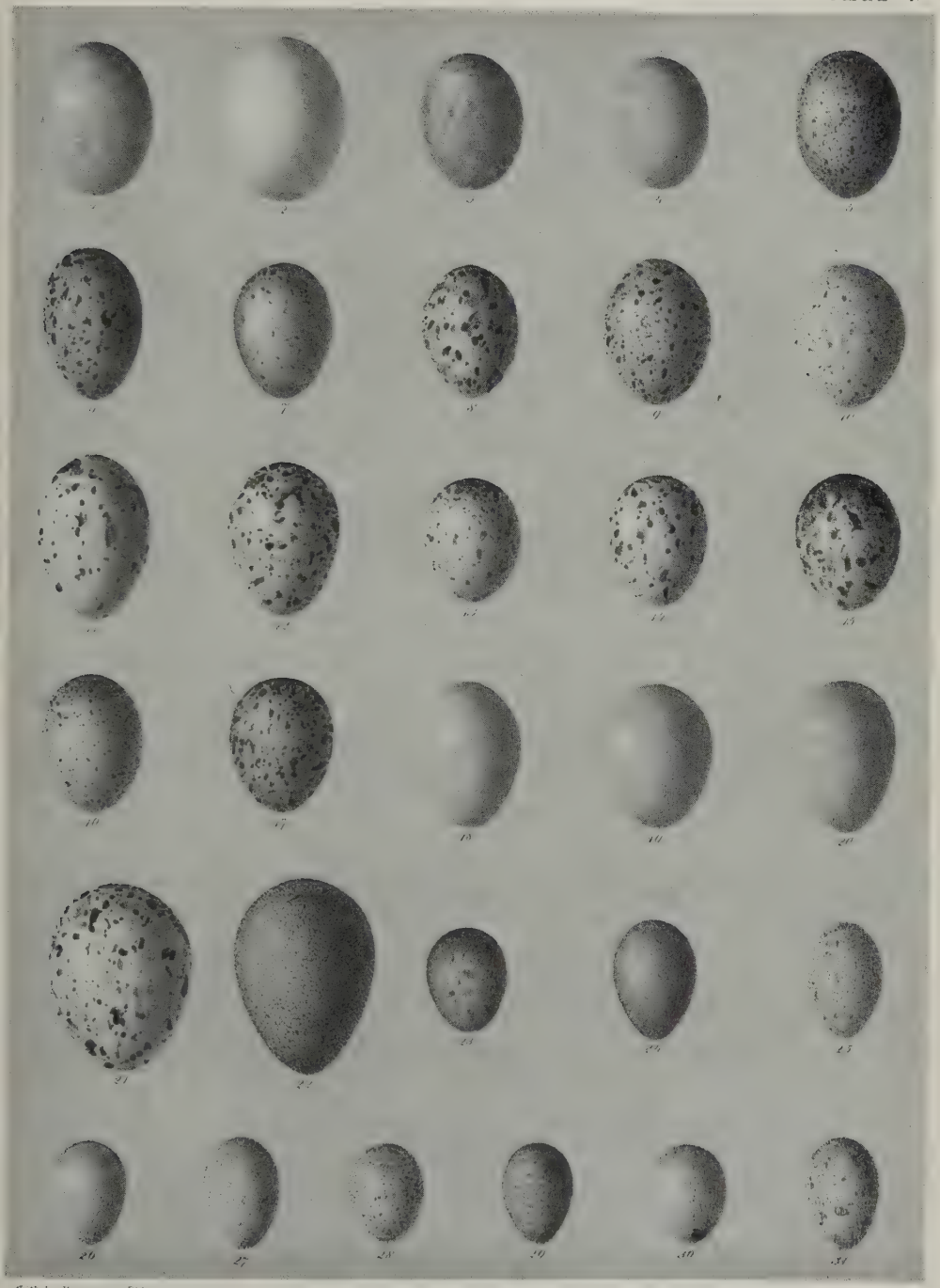
[1]Figs. 21, 22. Corvus americanus, Audubon. See Plate V.



Lith. by Kellerhaus Phila.

## EXPLANATION TO PLATE V.

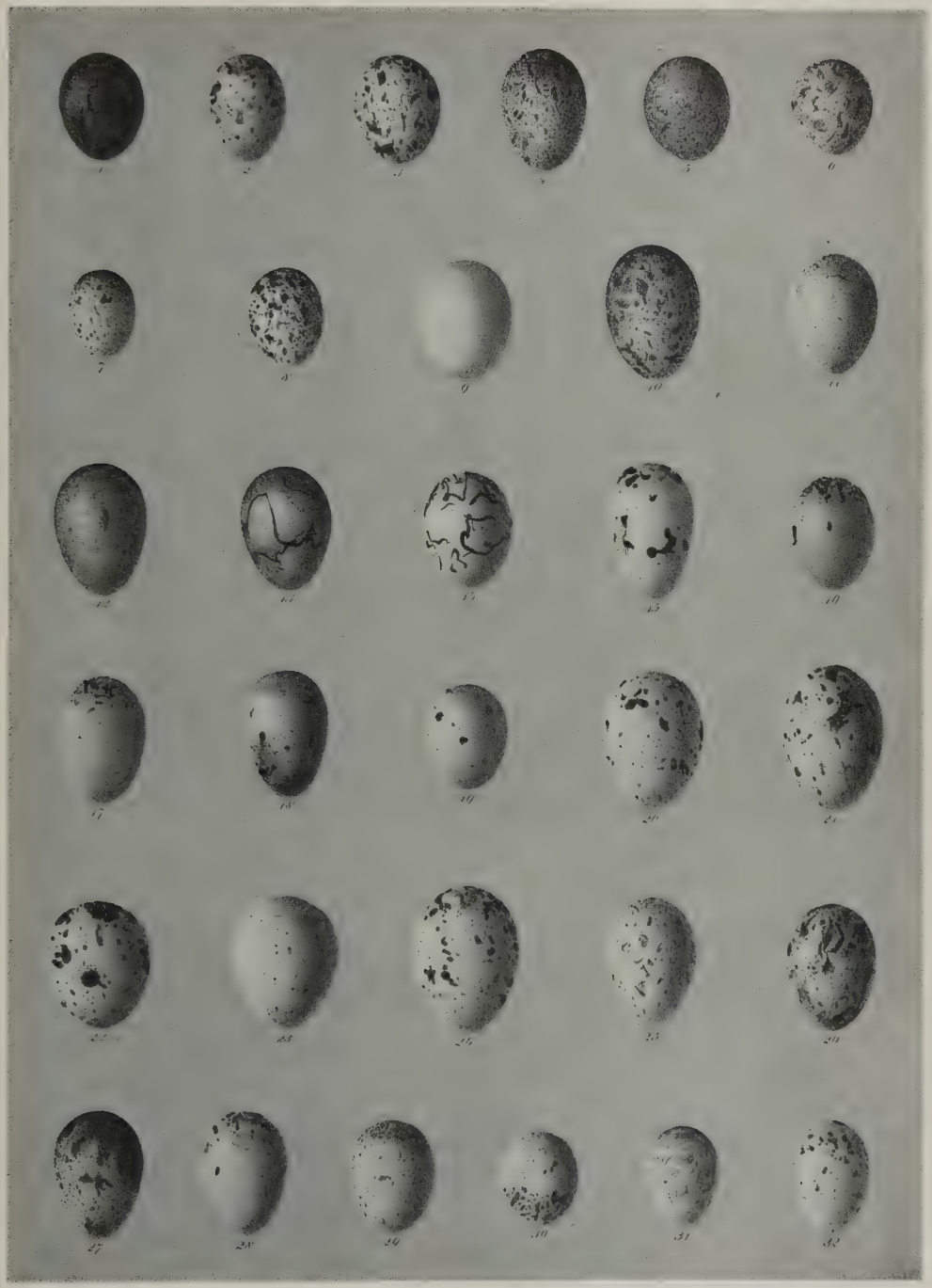
Fig. 1. Coccyzus americanus, Linnæus. Yellow-billed Cuckoo.
Fig. 2. Coccyzus americanus occidentalis, Ridgway. California Cuckoo.
Figs. 3, 4. Coccyzus erythrophthalmus, Wilson. Black-billed Cuckoo.
Figs. 5, 6. Cyanocitta cristata, Linnæus. Blue Jay.
Figs. 7, 8. Cyanocitta cristata florincola, Coues. Florida Blue Jay.
Fig. 9. Cyanocitta stelleri, Gmelin. Steller's Jay.
Fig. 10. Cyanocitta stelleri frontalis, Ridgway. Blue-fronted Jay.
Figs. 11, 12. Cyanocitta stelleri macrolopha, Baird. Long-crested Jay.
Fig. 13. Aphelocoma floridana, Bartram. Florida Jay.
Fig. 14. Aphelocoma woodhousei, Baird. Woodhouse's Jay.
Figs. 15, 16, 17, 18. Aphelocoma californica, Vigors. California Jay.
Figs. 19, 20. Aphelocoma sieberii arizonæ, Ridgway. Arizona Jay.
Figs. 21, 22. Corvus americanus, Audubon. American Crow.
Fig. 23. Alauda arvensis, Linnæus. Skylark.
Fig. 24. Otocoris alpestris leucolæma, Coues. Pallid Horned Lark.
Fig. 25. Otocoris alpestris praticola, Henshaw. Prairie Horned Lark.
Fig. 26. Otocoris alpestris arenicola, Henshaw. Desert Horned Lark.
Fig. 27. Otocoris alpestris giraudi, Henshaw. Texan Horned Lark.
Fig. 28. Otocoris alpestris chysolæma, Wagler. Mexican Horned Lark.
Fig. 29. Otocoris alpestris rubea, Henshaw. Ruddy Horned Lark.
Fig. 30. Otocoris alpestris merrilli, Dwight. Dusky Horned Lark.
Fig. 31. Otocoris alpestris adusta, Dwight. Scorched Horned Lark.



Lith by Kattentinus, Phila.

## EXPLANATION TO PLATE VI.

Figs. 1, 2. Dolichonyx oryzivorus, Linnæus. Bobolink.
Figs. 3, 4, 5, 6. Molothrus ater, Boddaert. Cowbird.
Figs. 7, 8. Molothrus ater obscurus, Gmelin. Dwarf Cowbird.
Fig. 9. Callothrus robustus, Cabanis. Red-eyed Cowbird.
Figs. 10, 11, 12. Xanthocephalus xanthocephalus, Bonaparte. Yellow-headed Blackbird.
Figs. 13, 14, 15. Agelaius phœniceus, Linnæus. Red-winged Blackbird.
Figs. 16, 17. Agelaius gubernator, Wagler. Bicolored Blackbird.
Figs. 18, 19. Agelaius tricolor, Nuttall. Tricolored Blackbird.
Figs. 20, 21. Sturnella magna, Linnæus. Meadowlark.
Fig. 22. Sturnella magna mexicana, Sclater. Mexican Meadowlark.
Figs. 23, 24. Sturnella magna neglecta, Audubon. Western Meadowlark.
Figs. 25, 26, 27. Icterus audubonii, Giraud. Audubon's Oriole.
Figs. 28, 29. Icterus parisorum, Bonaparte. Scott's Oriole.
Figs. 30, 31, 32. Icterus cucullatus, Swainson. Hooded Oriole.



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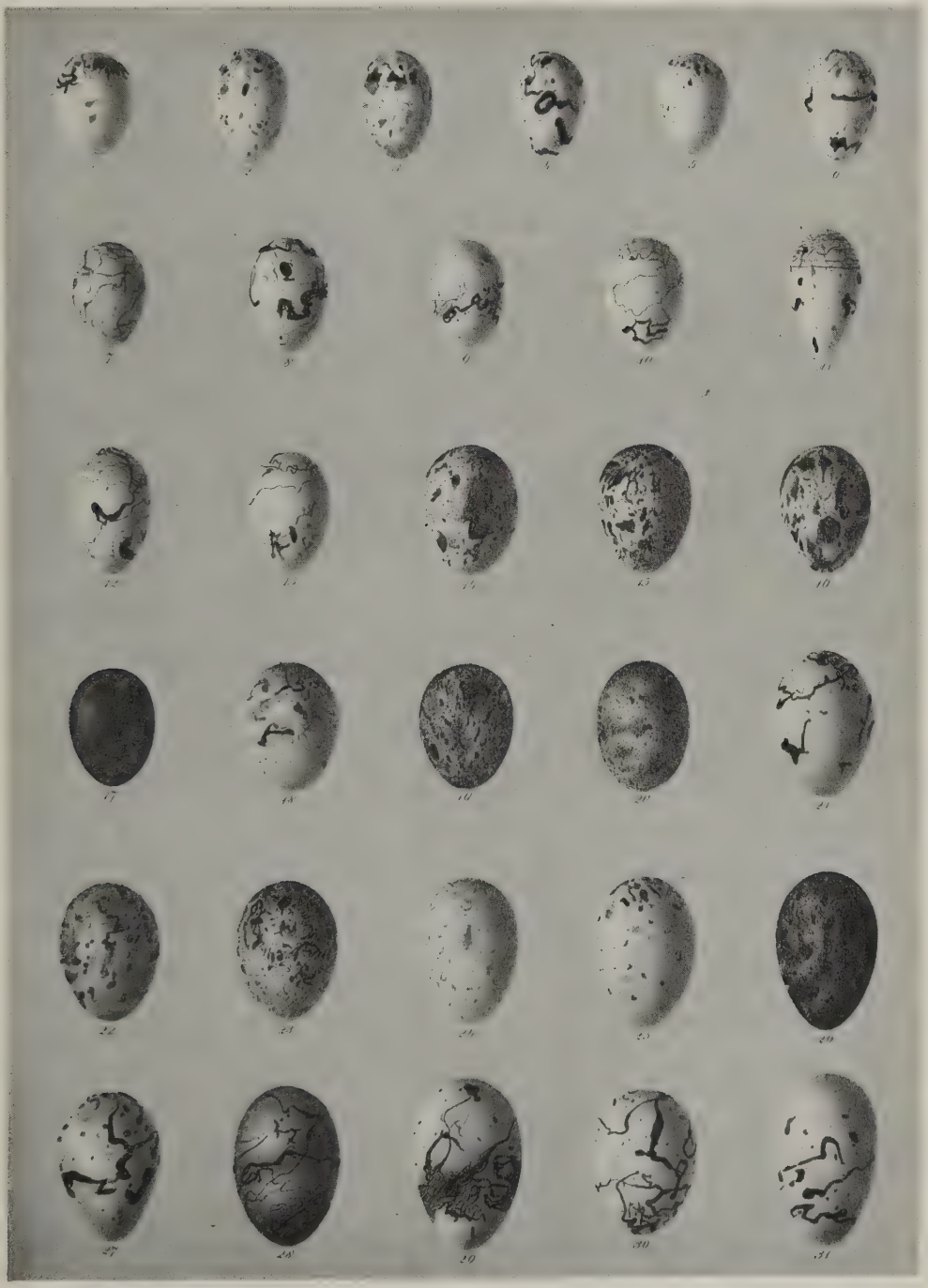
## EXPLANATION TO PLATE VII.

Figs. 1, 2. Icterus cucullatus nelsoni, Ridgway. Arizona Hooded Oriole.
Figs. 3, 4, 5. Icterus spurius, Linnæus. Orchard Oriole.
Figs. 6, 7, 8, 9. Icterus galbula, Linnæus. Baltimore Oriole.
Figs. 10, 11, 12, 13. Icterus bullocki, Swainson. Bullock's Oriole.
Figs. 14, 15, 16. Scolecophagus carolinus, Müller. Rusty Blackbird.
Figs. 17, 18, 19, 20. Scolecophagus cyanocephalus, Wagler. Brewer's Blackbird.
Figs. 21, 22, 23. Quiscalus quiscula, Linnæus. Purple Grackle.
Figs. 24, 25. Quiscalus quiscula aglæus, Baird. Florida Grackle.
Figs. 26, 27. Quiscalus quiscula æneus, Ridgway. Bronzed Grackle.
Figs. 28, 29. Quiscalus macrourus, Swainson. Great-tailed Grackle.
Figs. 30, 31. Quiscalus major, Vieillot. Boat-tailed Grackle.



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